

Case Study



A Simpson Strong-Tie® Company

FRP-System



Project	A9 - Viaduct Riddes
Location	Riddes VS, Switzerland
Object	Reinforcement access ramps
Year	2021
Duration	2 Months

Materials

1,880 m S&P C-Laminate 150/2000 120/1.4
800 kg S&P Resin 220 HP
S&P End-Anchors

Overview

The viaduct in Riddes, built in 1976, is a box girder bridge made of prestressed concrete. The structure is located in the centre of the cantonal and national transport system. It crosses the Rhone, the railroad line, the A9 highway, as well as municipal roads and pathways. It also allows the passage of the T9 cantonal road, which crosses the canton from west to east. Over the years, the largest highway interchange in Switzerland has become an icon of the region.

Situation

The viaduct had a design service life of at least 80 years, however there were design, construction and maintenance deficiencies. In addition, the volume of traffic and the associated loads have increased greatly over the years. An inspection of the structure found that in addition to corrosion problems and concrete deterioration, some of the tension cables were damaged.

In July 2019, the Riddes Viaduct was closed to traf-

fic of vehicles over 3.5 tonnes for safety reasons. Stakeholders agreed that the infrastructure had deteriorated and aged faster than expected. Therefore, a major intervention was needed to extend the life of the structure.

Starting in March 2021, the canton of Valais and the Federal Roads Office (FEDRO) embarked on an emergency renovation of the structure to extend its lifespan by at least 15 years. Among other things, reinforcement of the four access ramps was necessary.

Solution

In order to increase the resistance of various sections, the planning office, in co-operation with the contractor and S&P, decided to reinforce a total of eight 26 m long sections of the ramps. The installation of these reinforcements, consisting of carbon laminates (S&P C-laminate) on the underside of the box girders, was carried out without the need to

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▲ Span of 26m, reinforced with various S&P C-Laminate.

stop traffic. The advantages of this reinforcement are the quick installation, the very high tensile strength and, of course, the absence of corrosion.

A special feature of the reinforcement is the length of the S&P C-laminates: most of the laminates are 24 m long! Thanks to appropriate resources for installation and trained personnel, professional installation was ensured. Another special feature of this project is the curvature of the beams to be reinforced, it cannot be compensated by the carbon laminates. S&P therefore suggested shortening the laminates at certain points. End anchors at this point ensure that

they can absorb the anchoring force of up to 180 kN.

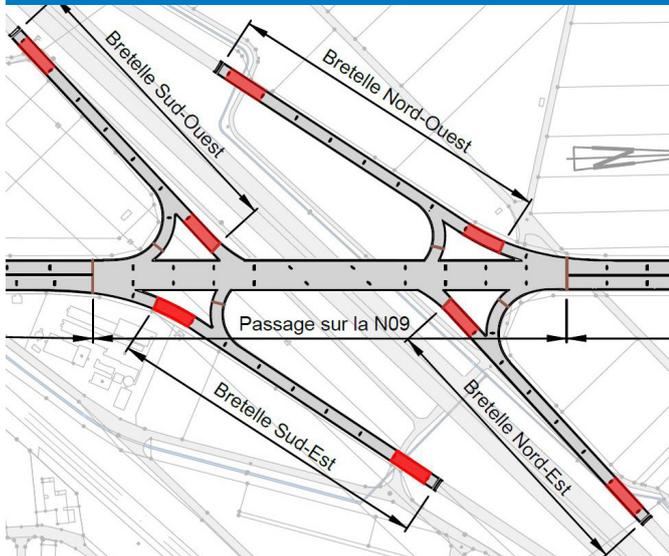
With these and other strengthening measures, the life of the viaduct could be extended and the structure brought up to date until a new motorway interchange is built.

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▲ Overview of the viaduct and the location of the areas reinforced with S&P C-laminates (in red)



▲ The preparation included marking and grinding the concrete substrate with an extended grinder



▲ Checking the evenness of the substrate after reprofiling slight irregularities with S&P Resin 220 HP

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