Case Study

Stream-covering bridge for four-lane highway

Built-fast-to-last Bludov bypass steel buried bridge crossing in Sumperk, Czechia.

THE CHALLENGE

The newly built Bludov bypass is a four-lane highway near the town of Sumperk in Czechia (the Czech Republic). A large-span bridge solution to cover a stream was needed.

A couple of challenges needed to be taken into consideration, including the relatively large span and poor soil conditions in the area. In addition, there was a demand for a short construction time and long bridge service life.

THE SOLUTION

To meet the requirements of the bridge project, a closed ViaCon Multiplate covering was designed to suit the need for both long service life and short construction time.

The Bludov stream crossing was crafted of a corrugated steel plate structure of a pipe-arch shape with a span of 9.96 m and a rise of 7.32 m. Due to the large span and the slightly skewed angle of the crossing, 8 mm plate and 200 x 55 mm corrugation was used for the height of cover over 5 m. The ends of the structure were reinforced with a cast-in-place concrete collar, which was done prior the backfilling of the assembled structure.

At the bottom of the structure a channel of quarry stone was placed in the concrete to accommodate the stream. All hot-dip galvanised backfilled plate surfaces were shop epoxy painted with a nominal dry epoxy film thickness of 300 µm; all galvanised visible plate surfaces and all bolt heads were shop epoxy painted with a nominal dry epoxy film thickness of 140 µm and polyurethane paint with a nominal dry film thickness of 80 µm.

After assembly all accessible bolt threads and nuts on the backfilled side of the structure were on-site epoxy painted in three layers with the same paint layers as the surrounding plates. After backfilling the structure with crushed gravel, an HDPE membrane was installed in the fill above the structure, serving as hydroinsulation.

The construction was finished and put into service at the end of 2023.

THE ADVANTAGE

The Bludov crossing solution offered a number of benefits:

- Faster installation: Compared to concrete, short construction is achieved.
- Simplicity: Reduced complexity on the job site, contributing to speed and ease of completion
- Sustainability: 100% recyclable steel is circular and enables a longer bridge lifespan
- Cost effective: Costs versus concrete are lower due to shorter construction time and less construction required on-site; less maintenance and longer steel lifespan make the structure more cost effective through its lifetime

SPECIFICATIONS

- Multiplate
- Pipe-arch shape with a span of 9.96 m and a rise of 7.32 m
- 8 mm plate and 200 x 55 mm corrugation
- Galvanised

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