

Clear the way for the new Čortanovci Viaduct on the Budapest-Belgrade high-speed line

Čortanovci Viaduct, Novi Sad, Serbia

The Budapest-Belgrade line is part, and the first stage, of the planned international railway connection Budapest-Belgrade-Skopje-Athens and is currently one of the largest investment and infrastructure construction sites in the eastern part of Europe. PERI supported the construction of the Čortanovci Viaduct on the Serbian section between Stara Pazova and Novi Sad - and in addition to intensive on-site support, also provided cleverly combinable system solutions based on the modular principle.

From Budapest to Belgrade in just three and a half hours: The railway line stretches some 350 km across the Serbian-Hungarian border. Until now, travellers had to put up with a whole eight hours to get to their destination - but that is soon to change. The immense modernisation project, which is divided into a total of three sections, is scheduled for completion as early as 2023.

One of the bigger challenges on this route was the Čortanovci Viaduct, which is located within the second, approximately 40.00 km long section between Stara Pazova and Novi Sad. As part of the double-track, open railway line, the viaduct covers a total length of 2.90 km and is supported by a total of 59 columns.

Approval to start the project, which is divided into five construction phases A to E, was given in November 2017. PERI provided significant on-site support for the construction of the two sections B and C, each 642.00 m long.

Clever system combination based on the modular principle

Both sections B and C were constructed using the same methodology in principle: Starting from the delta pier in the middle, concrete was poured simultaneously to the left and right. The 18.50 m high delta pier was therefore initially realised per carriageway in both sections. The construction workers found support in a clever combination of PERI UP and components from the

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VARIOKIT Engineering Construction Kit. The connection options of both systems made it possible to create safe access to all working areas and to integrate necessary work surfaces. Since both modular systems are based on a metric basic grid, they could be optimally matched to each other: Necessary adjustments to geometries and loads were made quickly and easily in 25 cm steps. Integrated reinforcement also meant that the pier became self-supporting. Thus, the already concreted bars did not need to be further supported.

The remaining columns of both stages were constructed in sections with a concreting height of 4.00 m each. For this, CB Climbing Units were used as working platforms to support the TRIO Panel Formwork as well as the VARIO GT 24 Girder Wall Formwork. The permanently mounted units consisting of platform and formwork enabled time-saving relocation by crane lift - and allowed the tight construction schedule to be adhered to.

Formwork and scaffolding from a single source

The two-lane superstructure in section C was realised with the help of a clever combination of PERI UP and the flexible MULTIFLEX Girder Slab Formwork. With a maximum support height of 20.00 m, the steel decks of the scaffold system provided high load-bearing capacity and enabled safe working at great heights. The choice of the appropriate formwork girder for MULTIFLEX was made according to the project-specific requirements for the span: the project managers decided on a mixture of GT 24 Formwork Girders for large spans as well as VT 20K Formwork Girders for smaller spans. The arbitrary combination of both girders as well as the free choice of girder arrangement allowed the site team a high degree of flexibility and led to an optimised use of materials.

Challenging height in section B

In section B, a new challenge followed - because a support height of up to 24.00 m was required in some places for the load transfer. The ALPHAKIT Shoring Construction Kit was chosen specifically because it is optimally designed for heights of up to 30.00 m. The system was particularly well received for its fast and safe assembly process: Due to the few, lightweight individual components, the assembly of the 24.75 m high towers proceeded with

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particular efficiency. These were pre-assembled by hand and on the ground. A crane was only used for positioning.

One ladder was also installed per tower, which could simply be plugged into the horizontal posts and secured with a wedge. This later allowed the workers vertical access to the head spindle, with which a flexible height adjustment of around 75 mm could be achieved. Due to the high tensile load of 107 kN, one tie per tower support had to be embedded in the temporary foundation.

ALPHAKIT Formwork Girders were used to give the workers vertical freedom of movement as well. Like the towers, these could be pre-assembled quickly and easily by hand on the ground and brought into position by crane. Supplementary working platforms of the PERI UP Scaffolding Kit ensured safe working at great heights. The installed PROKIT Guardrail also provided the site personnel with protection against open building edges at all times. The concreting of the superstructure was also carried out with the help of MULTIFLEX Girder Slab Formwork, as in section C.

PERI engineers provide support on site

During the entire project, PERI engineers were on hand to assist the site personnel. Intensive advance material planning as well as supportive and advisory supervision during the implementation of the systems ensured rapid construction progress. Thus, the massive modernisation project was achieved in a tight construction time frame of only two years. The viaduct is scheduled to open in mid-February 2021.

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Image 1

The two-lane superstructure in section C was realised in only five cycles using MULTIFLEX Girder Slab Formwork.
(Photo: PERI GmbH)



Image 2

PERI UP supported the MULTIFLEX Girder Slab Formwork with a support height of up to 20.00 m.
(Photo: PERI GmbH)



Image 3

In section B, the ALPHAKIT Shoring Construction Kit was chosen specifically because it is designed for a support height of up to 30.00 m.
(Photo: PERI GmbH)



Image 4

The integrated working platforms within the ALPHAKIT Formwork Girders allowed horizontal freedom of movement for site personnel.
(Photo: PERI GmbH)

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Image 5

For concreting the two-lane superstructure, ALPHAKIT was supplemented in section B with components of the MULTIFLEX Girder Slab formwork.

(Photo: PERI GmbH)



Image 6

The PROKIT Guardrail provided site personnel with protection against open building edges at all times.

(Photo: PERI GmbH)

Contractor

Main Contractor: RZD International

Subcontractor: Karin Komerc MD

Project Support

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