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10. Bridges of the Tauern Highway in the Lieser Valley

Owner:

Tauern Autobahn AG

General Planning:

H. Rella & Co. Vienna

Detail Planning:

H. Rella & Co. Vienna

Engineers Fritsch-Chiari, Vienna

Eng. office Popper, Vienna

Contractors:

Contractor group Rauchenkatsch L 22

RELLA-BEYER-ILBAU AG

Contractor group Kremsbrücke L 23/25

*RELLA-STUAG-ILBAU-BEYER-HAMBERGER-
HINTEREGGER-INNEREBNER-NEGRELLI*

Building time:

1977 to 1980

General

To complete the connection of Salzburg with Spittal, Carinthia, by a super highway in a short time, a large number of impressive bridgebuilding projects had to be carried out with the most advanced, highly industrial, mechanized erection methods. The bridges L 22 (hillside bridge Rauchenkatsch) and L 23/L 25 (valley crossing and hillside bridge Kremsbrücke and hillside bridge Pressingberg) in the Lieser valley with a total length of 4306 m will be described in the following. Especially the section Lieser valley within the Tauernautobahn was extremely difficult for the planning- and building-engineers, posing great problems, due to the geological conditions in this V-shaped valley with its steep slopes.

For the above-mentioned projects one uniform concept was applied to the superstructure, which proved to be most economic and superior in the competition to other designs because of the above mentioned topographical situation.

The steep flanks of the valley were instrumental in the choice of a superstructure of 25.5 m in width with one single girder for both driving directions, directing the bridge loads to one central pier, thus minimizing the expenses for excavation and foundation.

One type of bridge girder was chosen for a total length of 4306 m of different bridge sections. Only the erection methods for the central, prestressed concrete box girder varied with the different span lengths.

Superstructure

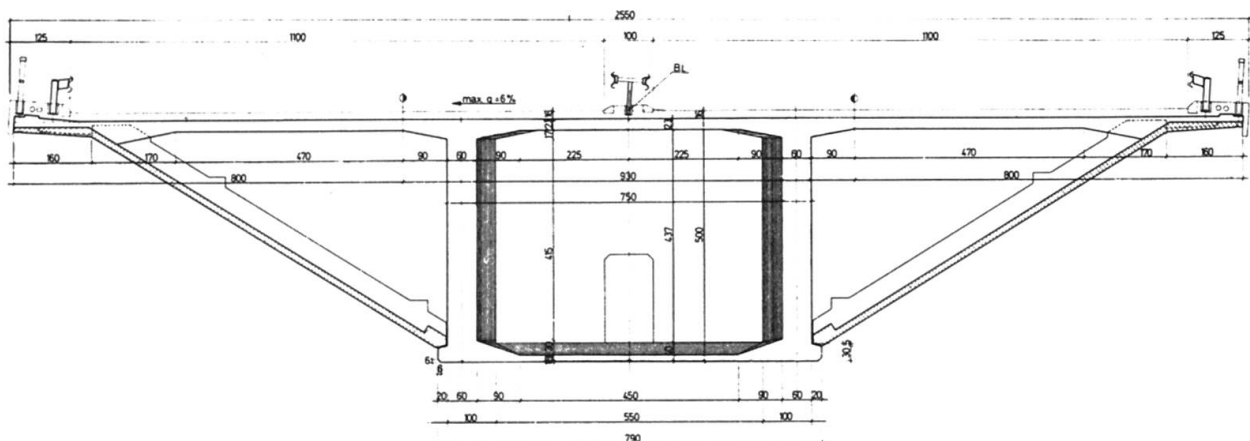
The regular span lengths for the projects L 22 and L 23/L 25 are 55 m with the exception of the large valley crossings with span lengths of 105 m and 115 m and pier heights of max. 84 m. The width of the bridges is invariably 25.5 m for both driving directions. The principle of the design is a central box-girder with invariable cross section and the same width as the piers (7.5 m). The girder has a thickness of 5 m. It is prestressed with BBR tendons. The top slab is transversely prestressed, also with BBR tendons. The girder was erected in advance with the help of different methods. The superstructure was then completed with the side parts of the road slab, which are supported by inclined, prefabricated slabs. Considering this type of superstructure, one can clearly see how tightly the design and the construction method are linked together in the field of large-bridge-building.

Substructure, foundation

The hollow piers have outer measurements of 7.5 m × 2 m. In distances of appr. 400 m the superstructure is divided by expansion joints. There the piers are thicker than the regular piers. The piers of the large valley crossings are modified. There are double piers at the valley crossing Kremsbrücke (L 23), due to the erection method (free cantilever), used there to stabilize the girder during the building process. The double piers have an axial distance of 9 m.

At the valley crossing L 22 (erection with launching girder and temporary piers) modified (thicker) regular piers are being used.

The foundation consists of two round concrete elements ("wells", diameter 4 m) under each pier, which are connected by a tie-beam and have an axial distance of 7 m.



Cross Section, Suspension
Bridges L22 and L23/L25

Rock anchors have been applied for the transversal horizontal forces (anchors in the tie-beams for forces from the superstructure, anchors in special anchor-beams, separated from the other structures, for the earth-thrust from the slope).

Construction

After the erection of the hollow piers (cast in sliding form) the central box girder was erected with the help of a large, heavy steel launching girder for the longest part of the two bridges (3831 m out of 4306 m). It took 14 days to produce 55 m of the prestressed concrete box girder. Because of the steep slope it was necessary to use a launching girder, positioned at the

sides of the bridge girder, to avoid large excavation at low piers. The mounting of the inclined, prefabricated slabs to support the side parts to the top slab, was done with the help of a portal crane, especially designed for that purpose, from the already partly prestressed central box girder. The inclined slabs were fixed to the girder by provisional anchor bars. The side parts of the top slab were cast in place on a small scaffold carriage, moveable on top of the inclined slabs, as the last part of the superstructure. After that the prestressing of the complete top slab could be done. Completing and transverse prestressing of the top slab for a length of a regular span took approximately 14 days.

(Wolfgang Köhler)



L 23 under construction



L 22 with launching girder