

Cable-stayed bridge across the Elbe

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Cable-Stayed Bridge across the Elbe

Le pont haubané sur l'Elbe

Schrägseilbrücke über die Elbe

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 Chief Design Engineer

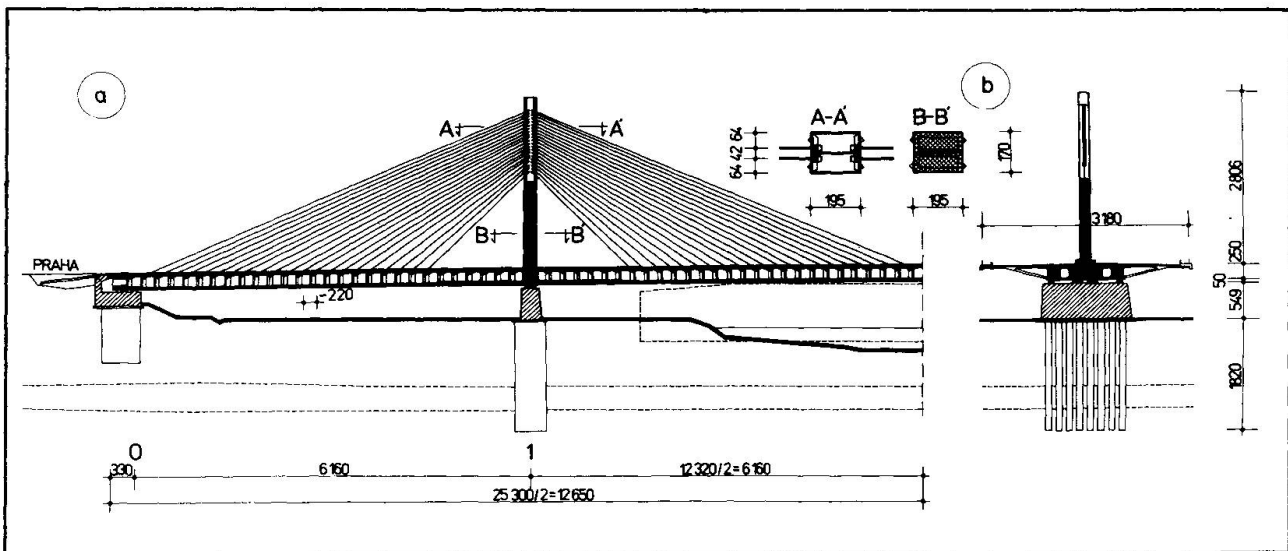
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The highway Prague - Hradec Kralove crosses the river Elbe on the cable-stayed bridge near spa Podebrady. The 32.3 m wide bridge has three spans of lengths 61.6 + 123.2 + 61.6 m, the total length of the bridge being 253.0 m / see Fig.1 /. The two three-lane carriageways are carried by one structure which is formed by a box spine girder with large outer cantilevers supported by precast struts / see Fig.2 /. The stays are arranged in one axial plane. The 28.06 m high towers are formed by two twin cell steel columns, which are fixed in the deck. In the upper part of each column the staves are anchored, the lower part of the columns is filled with concrete, which co-acts with steel.

The deck is constructed successively; first the spine box girder is assembled of precast segments, then the precast struts are erected and the outer cantilevers are cast / see Fig.3 /. The segments are 15.0 m wide, 2.5 m deep and 2.2 m long, the maximum weight of the segments is 60 tons. Along the central axis the deck slab is supported at intervals 2.2 m by prestressed tie rods transferring the force from the stays into the bottom corners of the box girder. Above the piers and at the ends of the bridge solid segments are designed. Precast inclined struts are formed by a slab which is strengthened by webs on its edges. In the longitudinal direction the deck is prestressed by cables of 6


Fig.1 Longitudinal /a/ and cross /b/ section of the bridge

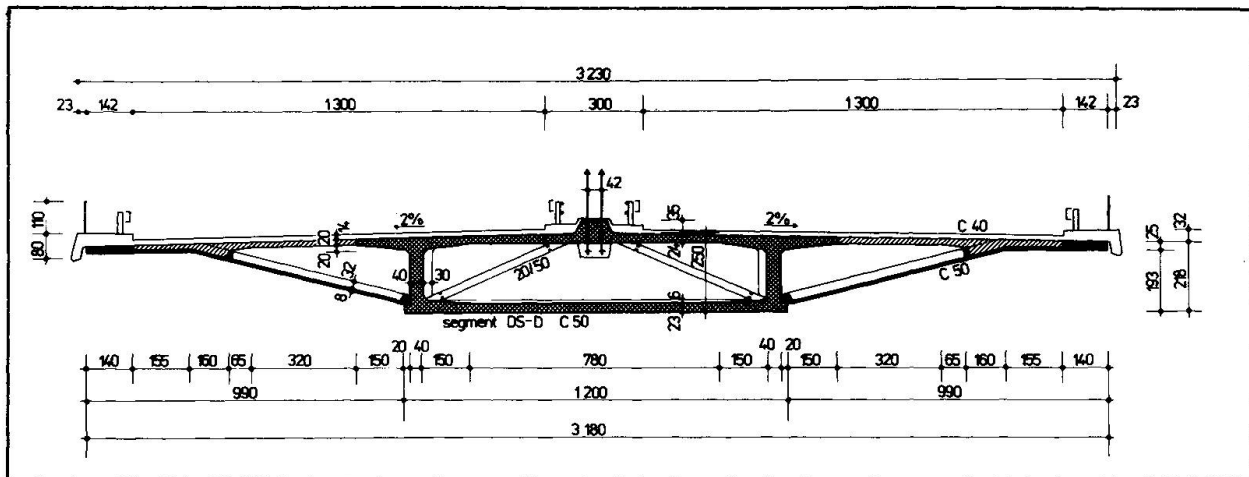


Fig. 2 Cross section of the deck

strands of 15.5 mm dia situated both in the top and bottom slab, in the transverse direction the top slab is prestressed by the same cables. The bottom slab is prestressed by bars only in the segments situated near supports.

Each stay consists of two cables of 18 /15/ strands of 15.5 mm dia of ultimate strength 1800 MPa. The strands are encased in steel tubes completely filled with cement grout, in which during construction compression is created. Prior to grouting, which is carried out after casting the outer cantilevers, the cables are tensioned to a high-load level. After the grout has cured, the cables are detensioned to a design level and the grout becomes a structural member.

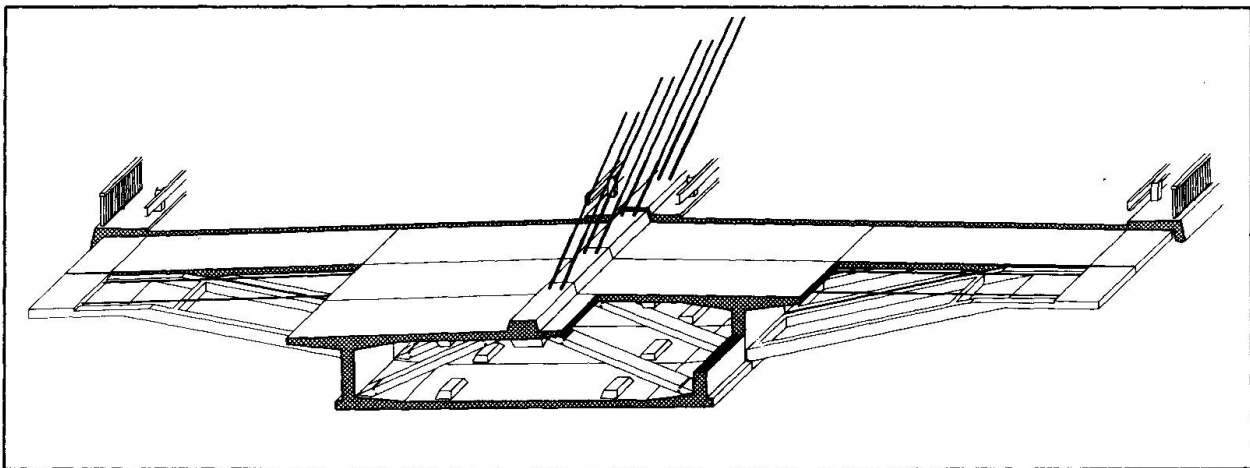


Fig. 3 Successive construction of the deck

The segments were match-cast on the fixed bed of length corresponding to $1/8$ of the bridge length. The spine box girder is being assembled in two progressive cantilevers which start from the abutments and proceed to midspan. During erection of side spans each sixth segment is temporarily supported, during the erection of the central span the erected segments are hung on the stays. Further, symmetrically to the towers, the precast struts and outer cantilevers are cast. After casting the joint at the midspan the deck is additionally post-tensioned. The erection of the deck started in March 1987 and will be finished in autumn this year.