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Steel and Reinforced Concrete Railway Structures

Structures en acier et en béton armé pour les ponts de chemin de fer

Eisenbahn-Brückenüberbauten aus Stahl und Stahlbeton

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For high-speed construction of railway bridges metal box and two-block steel reinforcement concrete superstructures of high plant manufacture readiness with 23.0 to 45.0 m spans ballast-run, designed for installation on straight and curved ($R > 300$) road sections under the conventional and northern climatic conditions, as well as in seismic regions, have been developed.

The superstructures were designed for a single track, that allowed their installation on the multitrack bridges having a common ballast tank. The ballast tank has the width of 4.6 m and is envisaged for the track operations on bridges including cleaning of broken stones with the help of tracking machines.

The structure material - low-alloy steel of grades C35 and C40, concrete of class B35. For all mounting connections high strength bolts are used.

For maintenance of superstructures, passages along the lower boom and hatches in the box girder bearing sections have been envisaged.

For the structure Specifications refer to the table.

N	Name	Metal box superstructure, m				Two-block steel reinforcement concrete superstructure, m			
		23,0	27,0	33,6	45,0	23,0	27,0	33,6	45,0
1	Construction height, H, m	2,1	2,6	3,1	3,7	2,2	2,4	2,8	3,5
2	Mass of metal, t	52,0	65,0	87,0	134,0	40,0	50,0	75,0	124,0
3	Volume of concrete, m ³	-	-	-	-	27,0	32,0	38,0	52,0

Table

The superstructure arrangement wholly corresponds to the high-speed mounting without intermediate supports by the jib (type ГЖК-80 and ГЖК-130) and boom cranes.

Metal superstructure (Fig.1,a) consists of the fully prefabricated erection blocks: main box-section hermetical girder; cantilever elements of the ballast tank, separated according to the transportation conditions from the main girder along the boarding with a longitudinal joint; side-walk blocks and inspection runways.

The roadway has a double-deck construction. Boarding of the ballast tank is made of the double-layer corrosion-resistant steel ensuring an overhaul-free period equal to the service life of the entire superstructure.

The two-block steel reinforced concrete superstructures (Fig.1,b) consist of two steel reinforced concrete fully prefabricated blocks joined in erection with cross linkage, as well as of the precast reinforced concrete side-walk rim. Each block consists of a steel box main girder and engaged into operation of the cast in-situ concrete ballast tank plate having hydraulic insulation and protective layer.

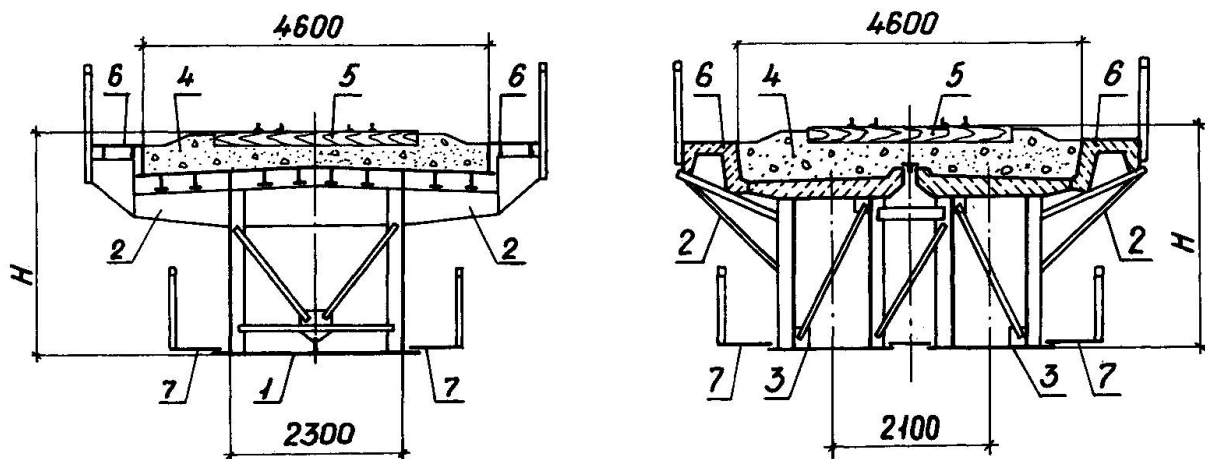


Fig. 1 Cross section of railway superstructures:
a - of the metal box one having the ballast tank of double-layer corrosion-resistant steel; b - of the two-block steel reinforced concrete;
1 - box girder; 2 - cantilever part; 3 - steel reinforced concrete block;
4 - ballast; 5 - upper road structure; 6 - side-walks; 7 - inspection runway.
H - construction height.