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3. Bridge over the Sura River in Penza

Designer: Design Institute Giprottransmost

Contractor: A constructional organization Glavmostostroï

Sphere of application: The bridge is meant to have 4 lanes for vehicular traffic and pedestrians

Full deck width: 19,5 m including 15 m-wide roadway

Static system: multispans frame cantilever bridge; 2-hinged frames with inclined pillars.

Spans 52.9 + 4 x 56 + 52.9 m

Longitudinal grades: vary from 0 to 4 per cent

Materials used per m² of bridge:

– concrete for superstructure: 0.60 m³

– concrete for piers: 0.82 m³

– steel: 145.5 kg

– high-strength steel: 20.5 kg

Traffic opened: in 1975

The superstructure is erected of precast prestressed 2-hinged frames (having epoxy adhesive joints) with inclined pillars of "running fallow-deer" type.

The rated spans of the river frames are 53.73 m, the bank ones 50.63 m, each cantilever being 8.71 m long. The cantilevers of the frame cap of the adjacent spans are linked at the ends by longitudinal hinges, so as to form a 6-span scheme.

The bridge cross-section consists of 3 box frames placed at the distance of 6.3 m from each other.

The frame caps and suspended elements are made of prestressed concrete with reinforcement placed in closed ducts. The inclined pillars of the frames are made of ordinary concrete 500.

The frame cap depth varies from 200 cm at pier locations to 140 cm in the span middle and to 110 cm at the ends of the cap cantilevers.

The frames were assembled of separate elements weighing up to 37 tons on travelling metal trusses.

The bridge approaches are made as embankments and viaducts. The river piers are of streamline conical shape. Their foundations are made of $d = 60$ cm tubular piles 12 m long.

The test results proved sufficient rigidity and strength of the construction.



Fig. 1 The general view of the bridge