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**Autor:** [s.n.]  
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## 2. Bridge over the Oka River in Ryazan

*Designer: Design Institute Giprotransmost*

*Contractor: A constructional organization of Glavmostostroi*

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

*Bridge full width: 18.0 m including 15-m-wide roadway*

*Static system: the river-bed part (58.2 + 2 x 84.0 + 58.2 m) is spanned by a frame-suspension superstructure. The bank parts (viaducts) have spans 32 and 64 m long.*

*Materials used per m<sup>2</sup> of the bridge:*

Materials	Left-bank viaduct	Right-bank viaduct	River part of the bridge	Average amount
Concrete for superstructure (m <sup>3</sup> /m <sup>2</sup> )	0.33	0.33	0.51	0.38
Concrete for piers (m <sup>3</sup> /m <sup>2</sup> )	0.44	1.184	1.33	0.87
Metal total (kg/m <sup>2</sup> ) including high-strength wire	111	163	169	140
(kg/m <sup>2</sup> )	18.7	17.1	23.7	19.6

*Traffic opened: in 1972*

The bridge is erected of precast prestressed concrete units. The transporting of 32 and 64 m long precast T-beams widely used by the contractor increased the erection rate. The prefabrication of the beams and other elements was well developed by concrete plants.

The mentioned T-beams (fig. 2) were used for suspended spans in the bridge river part having a frame suspension superstructure (fig. 1). The frame cantilevers were assembled of box-section elements (fig. 2) 3 and 5 m long, manufactured on the site near the bridge.

Epoxy adhesive joints were used between the adjacent elements.

High-strength tendons consisting of 48 d = 5 mm wires located in closed ducts were used for the preliminary squeezing of the cantilevers, a considerable number of inclined tendons being threaded into the box webs. The ducts were arranged with the help of duct-formers pulled out afterwards. 32 m and 64 m long T-beams were used for viaduct spans.

To improve maintenance conditions and to make the traffic more comfortable, each 7 - 8 spans are united into a continuous structure with expansion joints arranged only at the ends of the unit. The viaduct roadway made of concrete having hydrophobic additives without using a hydro-isolation layer.

The 2-pillar viaduct piers are precast and cast-in-place, with a cap.

The river piers are solid, with massive section, but above the water level they are hollow, with box section.

The river piers and part of right-bank piers have massive reinforced concrete well foundations. The foundations of the left-bank viaduct piers and the abutments are mounted on reinforced concrete piles (section 40 x 40).

The erection of precast units on the viaducts was carried out by gantry cranes K-451M, the erection of river spans, by cranes C П K-65 (fig. 3).

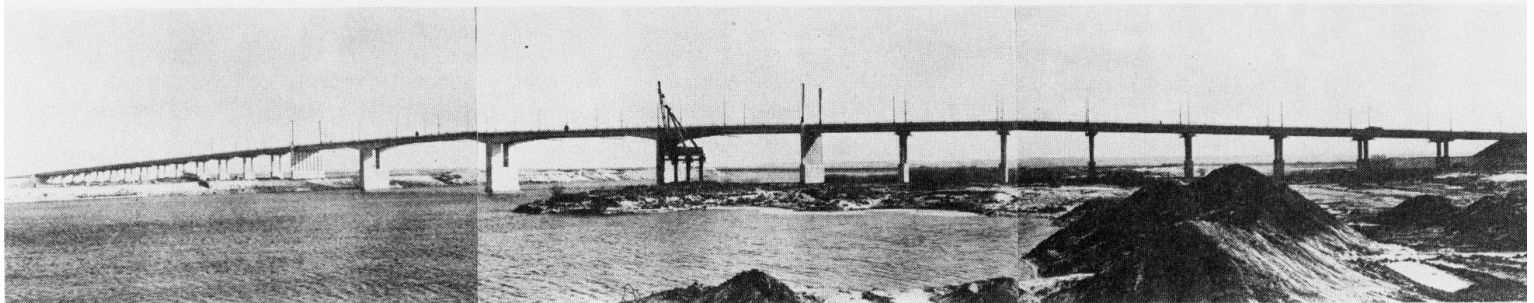


Fig. 1 The bridge scheme

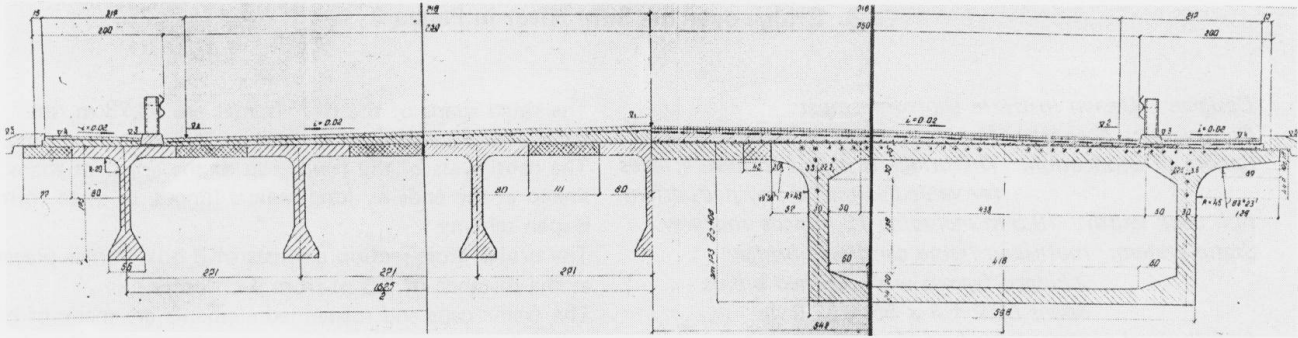


Fig. 2 Cross-sections

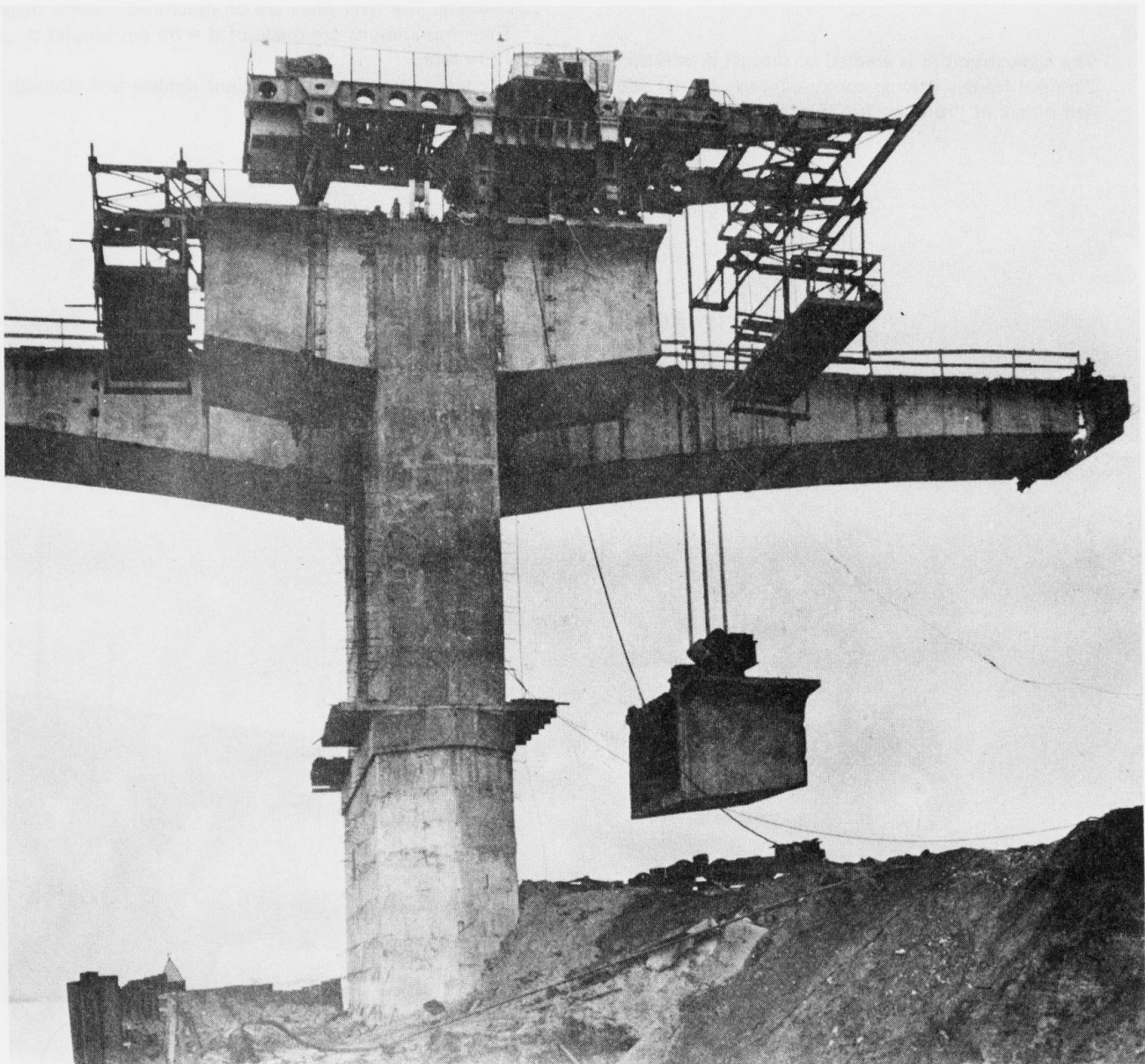


Fig. 3 The box elements erection by CTK-65 crane.