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5. Rizhskaya Flyover in Moscow

Designer: Design Institute Giprotransmost
Contractor: A constructional organization of Glavmostostroi
Sphere of application: The structure is meant to have 8 lanes for vehicular traffic and pedestrians
Full deck width: 39.5 m, including two 16.5 m-wide roadways
Static system: The structure consists of sections of various types – framework system with span lengths varying from 25 to 32.95 m; continuous superstructure with span lengths varying from 31.35 to 44.34 m
Longitudinal grade: up to 4.5 per cent, radius of vertical curvature is 10'000 m.

Materials used per m2 of structure (above the foundation top):
- *for prestressed concrete frame units:*
  reinforced concrete M 500 – 0.42 m3
  steel reinforcement – 88 kg, including 16 kg of prestressing steel
- *for continuous concrete superstructure:*
  rolled metal – 144 kg
  reinforced concrete – 0.2 m3

Traffic opened: in 1975

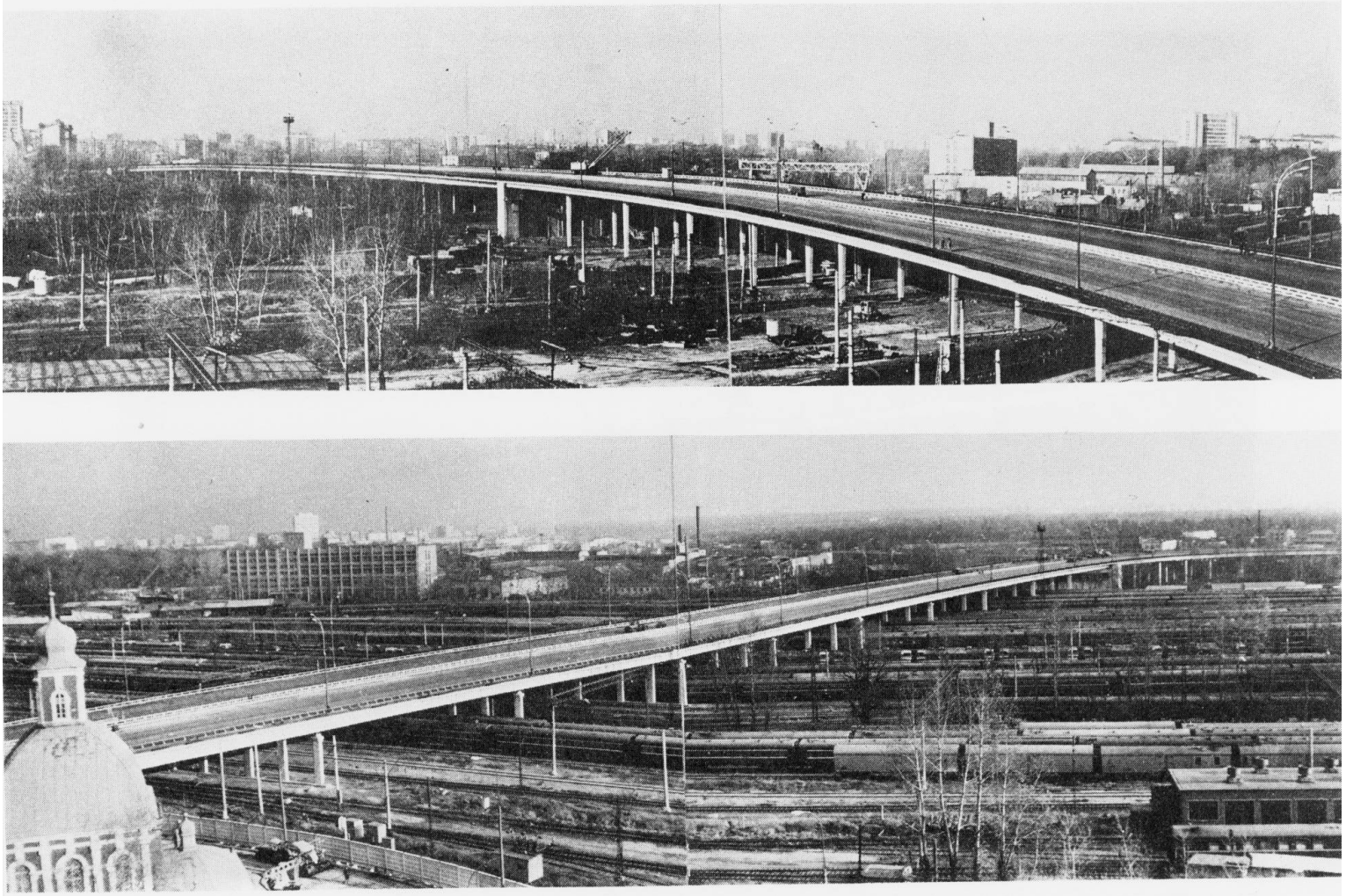

Fig. 1 The general view of the Rizhskaya flyover

The overbridge as part of the city's third ring highway crosses one of the most complicated transport junctions (64 tracks of Moscovskaya and Octyabrskaya railways and city traffic roads running beside them).
The designers took into consideration the traffic safety conditions, the city architecture requirements, the possibility of perspective crossing with future high-speed motorways.
From designing viewpoint, the flyover (Fig. 1) is a system of sections of statically various types made of steel concrete and precast prestressed concrete units.
The overbridge part including the continuous steel concrete superstructure is about 400 m long.
The girders (Fig. 2) are made of separate all-welded I-beams 1.52 m and 1.76 m deep. The precast 17 cm-deep deck slabs act together with metal units due to concreting longitudinal joints over the beams. The slabs of the locations having negative moments are preliminarily squeezed. The superstructure is supported by pillars through diaphragms linking the girders.
The pillars made of precast concrete have a cross-section 0.56 x 1.6 m, their smaller side being semi-circular.
The overbridge part erected of precast concrete members (Fig. 3) is over 340 m long, radius of curvature being up to 520 m. It consists of 3 frames, each including 4 spans of variable lengths.
The frame caps are made of precast prestressed I-beams up to 34.5 m long, 1.2 m deep.

The frame cross-section has 4 pillars of variable sections made of precast concrete elements. The beams are joined with the pillars by secret transverse cast in place concrete beams.
High strength wires d = 5 mm were used for prestressing reinforcement of the frames, and twisted ribbed bars (steel AШ and AП) were used for the rated non-stressed reinforcement.
The traffic curb consists of a low concrete wall 20 cm high and metal brackets attached to it with a metal pipe d = 159 mm passing through these brackets at the height of 0.7 m. The bridge railing is of welded metal with cast hand-rails and socles.
The erection of large precast concrete units was carried out by crawler cranes and locomotive cranes. Metal units of the continuous steel concrete superstructure were assembled in the location of the concrete frame of the flyover and then erected by longitudinal launching into final position (Fig. 4).

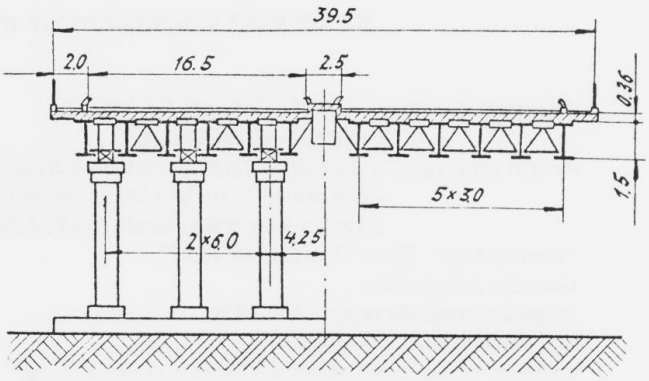

Fig. 2 Cross-section of the steel concrete part of the flyover

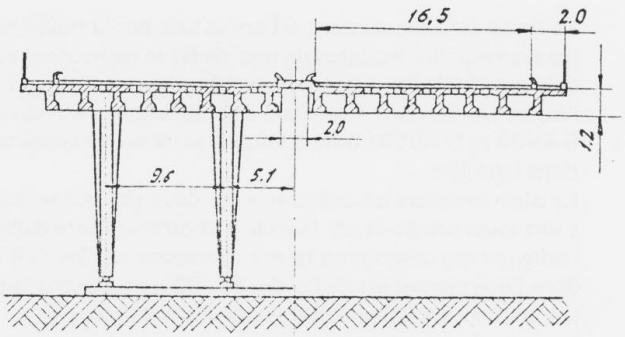

Fig. 3 Cross-section of the prestressed concrete part of the flyover

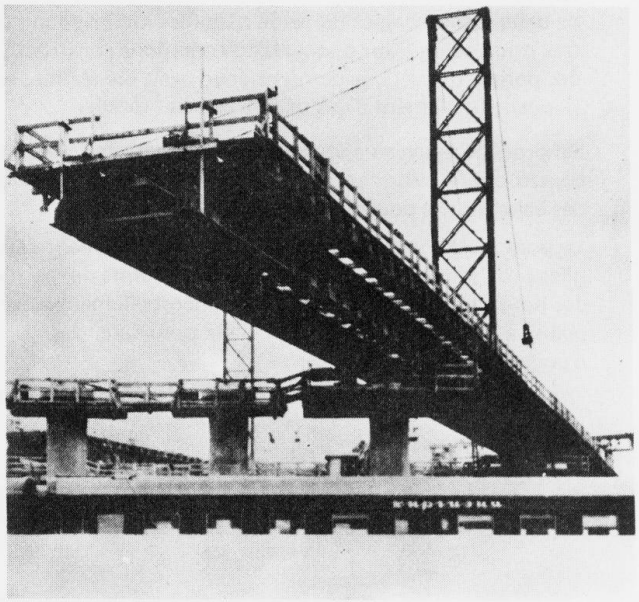

Fig. 4 Erection of the superstructure steel unit by longitudinal launching