



Railway Road Bridge in Novi Sad – Design and Erection

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Summary

The bridge is situated on the major international electrified railroad line No 2 (Belgrade-Budapest) and designed for to railway tracks (160 km/h), two road lanes and two footpaths, with the total width of 31,5 m. The bridge structure consists of four structures: two approach composite bridges at the banks and two steel tied network arch bridges over the river. The spans are 27,0 + 177,0 + 3,0 + 219,0 + 48,0 m, totally 474,0 m in length. The heights of arches are 34,0 m and 42,0 m respectively. The arches and ties, as well as the girders of the approach spans, are steel box girders. The decks of the arch bridges are the composite reinforced concrete slabs with thickness of 300 mm. The launching itself is very complex and unique, in both analysis and construction. The arch bridges are fully assembled on the banks and launched by platforms and skids over the bank and by barges over the river, to the final position on piers.

Keywords: Railway road bridge, tied arch bridge, steel bridge structure, composite bridge structure, dynamic analysis, erection, launching.

1. Introduction

The New Railroad Bridge across the Danube River in Novi Sad is situated on the location of the old road railway bridge – destroyed in air strikes 1999, on the major international electrified railroad line No 2 (Belgrade – Novi Sad – Subotica – State border – Budapest), over the Danube *Fig. 1*.



Fig. 1: Location of the bridge

Terms of Reference [1], composed by investor - Serbian Railways includes the following basic requirements:

- Bridge location: Location of the old bridge (1961-1999);
- Traffic across the bridge: 2 tracks + 2 traffic lanes + 2 footpaths;
- Structural system, as urban planning condition: steel arch structures over the river;
- Maximum line (train) speed: passenger trains – 160 km/h, freight trains – 120 km/h;
- Maximal vertical acceleration: $a_v \leq 1,3 \text{ m/s}^2$;

- Road and Rail: Rail tracks axes distance = 4,20 m, road lanes = 2 x (3,50+0,35) m, *Fig. 4*;
- Bridge accessories: Water pipes 2 x Φ 610 mm; Power and telecommunication cables; Power cables and accessories for the electrification of the railroad, for the public illumination, illumination