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40 Years History about Structure, Design and Construction of the First Steel Orthotropic Bridge in Sofia

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ABSTRACT

The most spectacular and large bridge in Bulgaria and one of the largest in South-East Europe bridge in Sofia was put into operation at the beginning of October 1983. The bridge perform a multi-span, prestressed reinforced concrete construction with a total length of 2114 m, a total width of 21.5 m and an average height above the ground of about 10 m. This important, effective and aesthetic bridge serves as a connection between the busiest input-output highway and the airport of Sofia. It ensures a convenient access to some highways, railways, streets and the airport. As a result of this requirement, the erection of the prestressed reinforced concrete bridge is not allowed to cross the railway between Sofia and Varna. So, a 90 m long middle steel part was designed to cover two spans of 45 m each in the multi-span bridge structure. In transverse direction the orthotropic bridge, consists of two individual parallel triple-box decks parts, which carry the traffic in two opposite directions. Each deck has a 7.5 m wide roadway with two lanes. The bridge is analysed as a frame structure using the finite element method. The design parameters of the bridge are verified by static and dynamic tests. The steel structure is designed as a two-span continuous beam with a box cross-section and an orthotropic deck. The paper deals with the most important aspects which consider the design approach and the construction process of this large, steel orthotropic bridge in Bulgaria.