Poster presentation

ADVANTAGES AND DISADVANTAGES OF MULTI-DIRECTIONAL MOVABLE BEARINGS ON THE INTERMEDIATE PIERS OF THE VIADUCT AT THE ANĐELI INTERCHANGE ON SUBSECTION 2B2-4 VEPRINAC–ANĐELI–ISTRIAN Y

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Abstract: This paper presents the selection of the bearing system for the substructure of the viaduct at the Anđeli Interchange, located on the Istrian Y, during Phase I of the Amendments to the Main Design, as well as the advantages and disadvantages of the chosen bearing method. The structure is designed as a continuous monolithic reinforced-concrete slab structure. The superstructure is a continuous monolithic slab system with three spans measuring 15.08 m + 20.10 m + 15.08 m. The substructure consists of piers S1 and S2, and abutments U1 and U2. The intermediate piers are located on steep slopes of a dry obstacle crossed by the viaduct, which is unfavourable in terms of excavation for the foundations. Multi-directional movable pot bearings, transmitting only vertical forces, are adopted at the intermediate piers. The pier foundations are formed of two piles with a diameter of 120 cm, spaced 541 cm apart transversely to the viaduct. Above the piles is a pile cap, from which two circular piers with a diameter of 120 cm extend in the direction of the piles. The selected method of supporting the superstructure on the substructure at the intermediate piers simplified the dimensioning of the intermediate piers and foundations, as well as the excavation for the foundation. At the abutments, it was necessary to determine the most favourable arrangement of fully fixed bearings for the transfer of horizontal seismic forces. The calculation model of the structure was developed using the SOFiSTiK software. At abutment U1, one bearing was designated as a fully fixed bearing, and the other was designated as a multi-directional movable bearing. At abutment U2, one bearing was designated as transversely fixed, and the other was designated as a multi-directional movable bearing. The dimensioning of abutment U1 and its foundation was more demanding than usual due to the need to withstand a large longitudinal seismic force from the fully fixed bearing, along with other associated loads from the embankment at abutment U1. The selection of multi-directional movable bearings at the intermediate piers offers advantages in the design of the bearings themselves, in the design and dimensioning of the intermediate piers and foundations, along with a significant reduction in excavation for the construction of piles and the pile cap on very steep and unfavourable terrain. The main disadvantage of selecting multi-directional movable bearings at the intermediate piers is in the demanding dimensioning of the fully fixed bearing at the abutment, as well as the dimensioning of the abutment itself, which transfer substantial horizontal seismic forces to its foundation. In conclusion, the described selection of bearings is the most optimal choice for the subject viaduct due to the access for constructing the foundations of the intermediate piers and abutments.

Key words: viaduct, bearings, foundations, seismic forces