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## THE 1915 ÇANAKKALE BRIDGE – CONCEPT DEVELOPMENT FOR SUBSTRUCTURE

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### ABSTRACT

The 1915 Çanakkale Bridge in Turkey carries the new Malkara-Çanakkale Motorway across the Dardanelles strait. The substructure of the suspension bridge with the world record main span of 2023m consists of the two tower foundations, the two anchor blocks and the two side span piers. This paper describes the concept development for the substructure. It is the first of two papers, with the second paper focusing on the design and construction of the substructure (Löhning et al., 2023). For all the substructure elements construction time, risks, sustainability, and cost are important parameters when selecting the most favourable concept. The soil conditions at the individual substructural element have the most significant influence on the selection of the best concept. Hence, an alignment study including the positioning of the substructure elements is the first step to find the optimal substructure concept.

The two towers are founded at water depths up to 45m. Open dredged wells, a steel truss structure, a classic pile cap with steel piles, and a concrete caisson foundation are considered for the design. Critical load cases are ship impact and seismic loadings.

For the anchor blocks deep foundation with excavation within one or two diaphragm rings are investigated. For the Asian anchor block an alternative concept with a flat massif and shear walls below is developed. For the European anchor block a relocation with a tunnel anchorage or with a massif partly buried in a rock outcrop is investigated.

**Keywords:** Substructure, Çanakkale, anchor block, tower foundation, suspension bridge, seismic, Maintenance

### INTRODUCTION

This paper describes the concept development for the substructures for the 1915 Çanakkale suspension bridge in Turkey, with the world record main span of the 2023m. The substructures consist