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1915 Çanakkale Bridge – Detailed Design

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ABSTRACT

Detailed design of 1915 Çanakkale Bridge posed a number of challenges and called for innovative engineering decisions and design to determine the best possible bridge arrangement under these circumstances. The geology along the bridge alignment ranging from very soft rock to complex soft soil conditions imposed tremendous challenges to the bridge design and resulted in the special layout where anchor blocks are moved away from the shoreline to reach competent soils. With a world record main span of 2023 m crossing the windy Çanakkale Strait significant design challenges for aerodynamics had to be dealt with. To achieve a wind-resistant design the long slender stiffening girder of the bridge is designed as a twin-box steel girder and for all elements great effort was put into analysis of the aerodynamic performance of the bridge and verification of the safety of the bridge by wind tunnel tests. Another challenge related to very dense ship traffic of Çanakkale Strait calling for robust design accommodating accidental ship collision loads. Further, the bridge is situated in a seismically active region and strict requirements from the Owner in this regard affected the design significantly. However, the ultimate design challenge was time. Bridge design and construction was to be completed within only 5 years impacting also the need for innovative solutions for fast construction.

Keywords: Suspension bridge, Detailed design, General arrangement, Articulation, Design basis, Accidental loads, Aerodynamics, Wind tunnel testing, Ship collision risk, Seismic loading.

1 INTRODUCTION

The 1915 Çanakkale Bridge in Türkiye, located 200km southwest of Istanbul, carry the new Malkara-Çanakkale Motorway across the Çanakkale Strait and form an important crossing between Asia and Europe. The world record main span of 2023 m crosses waters as deep as 90 m and provides a navigational clearance of 1600 x 70 m. The bridge was inaugurated 18. March 2022 only 5 years after the contract was awarded and the bridge is now in full service.