

Paper ID:6190
**THE 1915 ÇANAKKALE BRIDGE – DESIGN AND
CONSTRUCTION OF SUBSTRUCTURE**

Thomas Löhning
THLG@cowi.com

Uffe Graaskov Ravn
UGJ@cowi.com

Flemming Pedersen
FP@cowi.com

Louis Westh Moe Christoffersen
LMCH@cowi.com
All COWI A/S
Lyngby, Denmark

ABSTRACT

The 1915 Çanakkale Bridge in Turkey carries the new Malkara-Çanakkale Motorway across the Dardanelles strait. This paper describes the design of the substructure of the suspension bridge, which has a world record main span of 2023 m. The substructure consists of the two tower foundations, the two anchor blocks and the two side span piers.

The paper describes design to achieve fast-track construction and resilient structures with optimized material quantities. For the tower foundations an innovative solution consisting of a lower cellular reinforced concrete base and an upper part consisting of two hollow composite steel shafts which extends above water level have been developed. Critical temporary construction stages, including the immersion process, ship impact, and seismic loadings, call for complex structural analysis and verification.

For the anchor blocks efficient concepts have been developed to optimize quantities of concrete and excavation. At the European side this is done by taking advantage of the local soil conditions and activating the backfill on top of the anchor block as counterweight and at the Asian side anchor block an innovative concept with diaphragm panels at the bottom of the anchor block has been developed to enhance the horizontal shear resistance with the ground.

For the side span piers supporting the ends of the main steel bridge deck and the concrete girders of the approach bridges soft soil and seismic forces requires deep bored concrete pile foundations with special measures for improved soil in the upper liquefiable layers.

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