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The 1915 Çanakkale Bridge – Design of Towers

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ABSTRACT

The world record 1915 Çanakkale Bridge across the Çanakkale Strait in Türkiye is carrying a new highway connecting Europe and Asia. The suspension bridge has a main span of 2023 m and a tower height of 318 m. The towers are manufactured in steel primary to reduce the construction time and comprise of approximate 36000 tonnes. The H-shaped towers with three cross beams consist of closed steel boxes. The inclined tower legs have a base dimension of 11.0 x 10.5 m which reduces to 8.0 x 7.5 m just below the tower saddles. The butterfly shaped cross beams have a constant width of 4.0 m and varies in height from 5.0 m at centre to 8.0 m at the leg intersection. The tower legs are divided into 32 erection blocks which are lifted as full blocks with a floating crane or divided into panels and lifted by a heavy-duty tower crane. The tower block assembly is carried out by skin plate welding combined with friction grip bolting of the longitudinal stiffeners. The design of the steel towers is carried out in accordance with Eurocodes. The design philosophy is explained along with a presentation of the governing load situations; ultimate limit state, ship impact, and temporary bridge erection phases. Also, the special areas at the tower base, bridge deck and cross beams, where additional strengthening is needed will be touched upon. The towers are designed with focus on maintenance costs with smooth outer surfaces and internally protected by a dehumidification system.

Keywords: Tower design, suspension bridge, steel design, Çanakkale