

Innovative Technology of Yavuz Sultan Selim Bridge Design and Construction

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Abstract

This study dealt with innovative technologies developed for the structural design and construction of a new hybrid cable bridge named Yavuz Sultan Selim Bridge. It is a cable-stayed suspension bridge under the combined road and rail loading which is located in the northern side of the Bosphorus strait. It was proposed at an initial stage as a conventional suspension bridge type with truss double deck which has the sufficient rigidity to ensure its stability in an extreme environment and serviceability in a railway operation status. However, a new bridge in the Bosphorus strait was required to be aesthetically harmonized with existing two suspension bridges. For this reason, a hybrid bridge type in a high rigidity composing of a cable arrangement with orthogonal single box was developed for achieving good aesthetic view and serviceability in rail operation status. The techniques reported in this paper were focused on a hybrid system for the high-rigidity suspension bridge, a pendulum bearing for an additional rigidity and a newly developed fatigue test criteria for stiffening cable and damper designs. In addition, a plan of temporary struts and a Tower top beam(TTB) installation, special measures to resist against wind effects during the construction and for deck closures were enunciated in the paper.

Keywords : 3rd bosphorus bridge, Cable stayed suspension bridge, Hybrid cable, Rigidity