



SEISMIC PERFORMANCE ASSESSMENT OF APPROACH VIADUCTS OF BOSPORUS BRIDGE

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The objective of this paper is to determine the dynamic characteristics and structural earthquake performance of two approach viaducts of the Bosphorus suspension bridge. The approach viaducts named as Ortaköy at European continent and Beylerbeyi at Asian continent have a length of 231 m and 235 m, and five spans and four spans, respectively. Ortaköy and Beylerbeyi approach viaducts are side span of the bridge and there is no hanger element at these viaducts because they are supported at the base. The main structural elements of the viaducts, columns and beams, have steel hollow section. Taking into these considerations, 3-D computational structural finite element model was developed by using frame elements, and natural frequencies and corresponding mode shapes of the viaducts were presented in the study. Subsequently, it is aimed at obtaining structural earthquake performance of the viaducts by implementing nonlinear pushover (NPA) and nonlinear time-history analysis method (NTHA). For NTHA, three earthquake ground motions were simulated according to specific elastic design spectrum by paying attention to the location of the suspension bridge. The results from these analysis methods were presented and seismic performance of the viaducts was determined considering Turkish code for the earthquake design of railways bridges (TSC-R/2008) and Caltrans (Caltrans-2001) seismic design of steel bridge. The differences between earthquake performance of the viaducts obtained by considering these codes and analysis methods were presented.

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