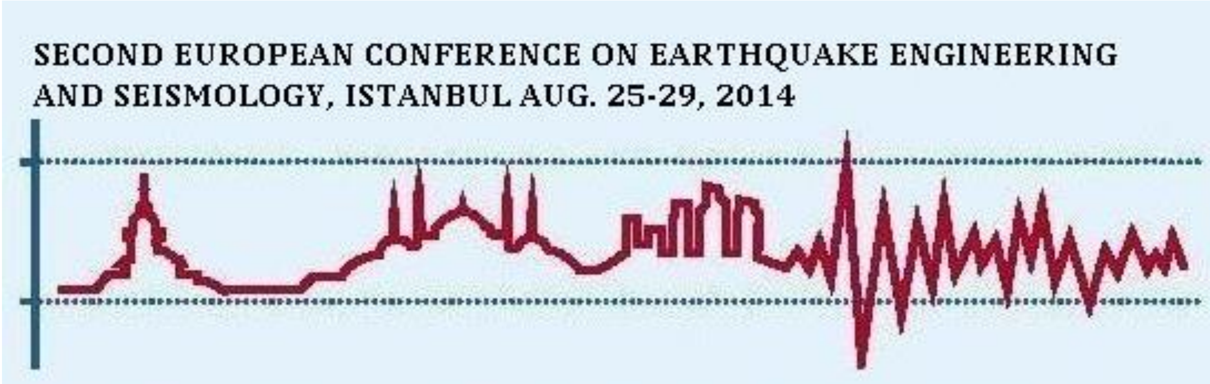

SEISMIC DESIGN OF THE VIADUCTS OF IZMIR AIRPORT

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Design of critical facilities in highly seismic zones has always been challenging for structural engineers. The transportation network, for instance, is a vital component of effective Search & Rescue and Recovery phases of disaster management after a possible strong tremor.

This paper focuses on seismic design of the connection viaducts of the International Terminal of Izmir Adnan Menderes Airport. High seismicity of the site, the railway network and the roads in operation in the construction area, quite low tolerance in design and construction errors render the design of the viaduct structure rather difficult.

The viaduct has been designed per AASHTO 2002 LRFD (AASHTO, 2002) Code where the PGA value is assumed as 0.40 and the rest of the design spectrum is constructed according to the AASHTO (İntaç, 2014). The main bearing system in the superstructure consists of 120cm deep pre-stressed pre-cast simply-supported beams. The steel canopy on the viaduct is supported on a steel box section which supported by the elastomeric pads on the main piers.

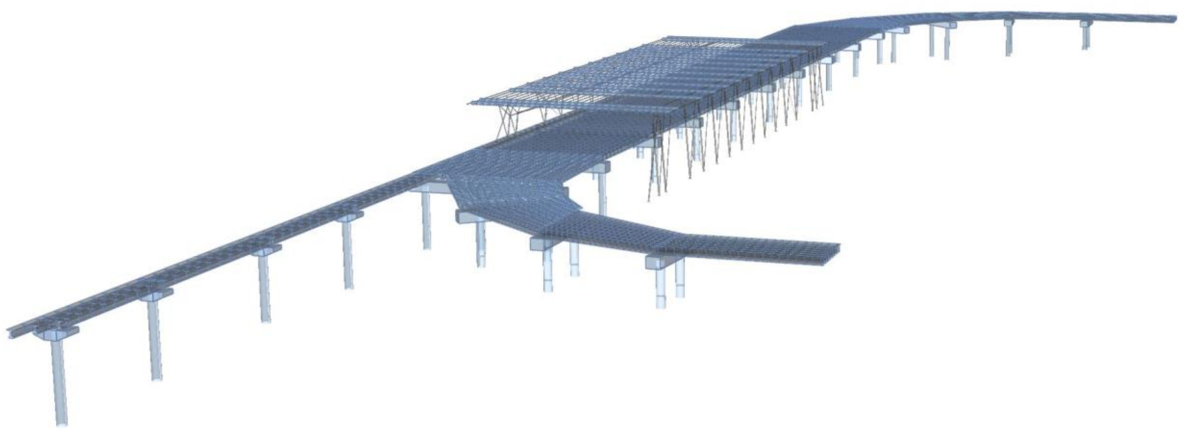

Figure 1. The perspective view of the viaduct

The main challenge during the design was the design of the middle piers. The terminal building, which was designed and constructed before the viaduct, was not designed to bear the forces that will be induced by the foundations of the piers. Thus, as a solution, the foundations of each pier of the middle piers was built in a different elevation, resulting thus to a group of piers with varying height. This issue was reflected in the nonlinear analyses as a constraining parameter for the design and seismic response of the middle piers. The steel canopy, on the other hand, was another challenge not only because it is a different structure on the viaduct the response of which needed to be defined

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accurately, but also because the columns of the canopy had to follow the main girders of the viaduct. Furthermore, the vertical and horizontal curving of the bridge were constrained due to the railroad, it was thus difficult to keep the viaduct in a certain geometrical frame while satisfying the comfort rules and the design requirement simultaneously.

Figure 2. Construction photos of the viaduct

The design results and the nonlinear analyses used for the verification of the design have been discussed in detail in this paper. The performance of the viaduct has been assessed by using the existing criteria cross-checking if the viaduct, which is an important component of the transportation network of Western Turkey, could be in function after a strong shaking.

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