Determining of Earthquake Damages on Large Engineering Structures by Using Geodetic Approaches after Earthquakes, Case Study: Bolu Tunnel

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ABSTRACT

The November 12, 1999 earthquake caused substantial damage to one of the Bolu Viaducts and to the Bolu Tunnel, which was under construction at the time of the earthquake. The damaged viaduct, which was almost completed in November 1999, is labeled hereafter as Viaduct No. 2. Another Bolu Viaduct, which is referred to as Viaduct No. 1, was in an early stage of construction and did not display any visible sign of damage. The viaducts and tunnel are part of a 1.5 billion dollar project that aims at improving transportation in the mountainous terrain to the west of Bolu between Istanbul and Ankara. The aim of this study is to investigate the deformation occurred on structures of the Bolu pass of Ankara-Istanbul Motorway after 17th August Marmara and 12th November Düzce earthquakes.

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