

Monitoring Bridge Deformations during Static Loading Tests Using GPS

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SUMMARY

The static loading test of a bridge is a fundamental check of the actual behavior of a bridge under extreme loading conditions. By measuring bridge deformations and comparing it to expected theoretical values resulting from design, bridge safety can be assessed. In this paper, GPS is presented as a viable tool to monitor bridge deformation in Egypt. GPS was used for deformation measurement and the results were compared to those of precise leveling. Based on the results, it was feasible to continuously monitor selected points along the bridge and to overcome problems relating to leveling benchmarks.

Two GPS Trimble receivers were used to monitor deformations of Maadia Bridge during static loading tests. The bridge lies along the Northern International Coastal Road, between Rasheed and Abu-Quier. The GPS receivers were set up to record signals every 3-sec. and the On The Fly (OTF) technique was used to process the GPS observations. The results were then post-processed using two different techniques; filtering and improved mean value, in order to filter out noise and undesirable frequencies. The final GPS results were found to be consistent with those obtained from precise leveling.