



Structural Health Monitoring of the Çanakkale Bridge in Turkey, the largest monitoring system for the longer bridge in the world.

Stéphane JOYE

Sixense Monitoring, Nanterre, France

Marcel De Witt

Sixense Monitoring, Bruxelles, Belgium

Contact: stephane.joye@sixense-group.com

Abstract

This bridge is outstanding and so will be its Structural health Monitoring. Designed and installed by Sixense upon the specification of the Client, the system will manage more than 1000 sensors. This monitoring architecture will allow to measure any external event happening on the bridge such as strong wind, earthquake, lightning, heavy traffic. It will also record all the reaction behavior of the structure such as temperature, displacement, vibration, fatigue stresses. Amongst all the recorded data, dynamic record of such a slender structure is key. The acquisition system provided by Sixense will allow to record, compute, sample, analyses, store and analyse a tremendous quantity of data from all kind of mechanical behaviour of the structure. It will for instance allow rainflow treatment of the stress of the orthotropic slab in order to survey and prevent fatigue failure.

But more than simply recording data for visualization and immediate maintenance, the system provided by Sixense will also allow to perform predictive computation of the future behavior of the infrastructure : regression analysis from the available data combined with tuneable environment parameters (temperature, traffic), will allow the owner of the bridge to anticipate the behavior of the bridge and plan the maintenance operation far in advance out of critical service activity phases. This will increase the safety of the bridge, save money for the owner and allow this signature bridge to last for a very long time.

Keywords: SHM, Bridge, Suspension, Sensors, Turkey, Longest, World, record, Strain Gages, Structural Health Monitoring, Digital twin.