

A New Geodetic Network Design for Hydro Power Plant Permanent Deformation Monitoring Project

Marco di Mauro, Joel van Cranenbroeck and Andrey Balan

KEY WORDS: Interdisciplinary Approaches for the Design and Analysis of Deformation Measurements, Monitoring Concepts for Static and Dynamic Deformations of Engineering and Geotechnical Structures, Applications in Geotechnical and Structural Engineering, Multi-Sensor Systems and Sensor-Networks

ABSTRACT:

The global demand for energy is increasing and as the consequence of the Fukushima nuclear disaster the authorities are considering again the necessity of building new Hydro Power Plants and to maintain or upgrade the power capacity of the existing ones. Monitoring systems thus become an essential element to control and keep the efficiency of power plants high and to prevent risks. The geodetic monitoring network design for these structures present many challenges such as lack of stable points for the positioning of instrumentation (the abutments are often not considerable stable), the deterioration of the optical measurement performance (due to the presence of the water of the river or the reservoir), the presence of the plant infrastructure and equipment for its maintenance which are obstacles for lines of sight and for satellites tracking. With the task of a millimeter level monitoring of the Hydro Power Plant structure the use of Automatic Total Stations and GPS/GNSS antennas and receivers has been integrated into an innovative design previously imagined to monitor the core wall of high rise buildings (GPS Active Control Points). The use of temporary pass points to propagate the coordinates and create indirect lines of sight have been added. The accuracy and reliability achieved by that combination of instruments and processing softwares complies with the mandatory level of millimeter accuracy.