

# **The Geodetic Surveying Methods in the Monitoring of Large Dams in Portugal**

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## **ABSTRACT**

Conventional terrestrial geodetic surveying methods, such as precision triangulation, traversing and geometric levelling, have been present at the displacement monitoring systems of the majority of the Portuguese concrete and masonry large dams, since the 1940's. In spite of the widespread use of displacement measurement instruments, such as pendulum and rockmeters, geodetic surveying methods continue to be used in the displacement monitoring systems because they provide: i) An independent control of the other methods; ii) A global relation between the dam, its foundation and the surrounding terrain. The Geodetic Measurement Division (GMD) of the National Laboratory for Civil Engineering, which is involved in dam surveillance activity since the 1950's, is responsible for planning and observation of geodetic surveying systems for more than fifty large dams. The paper presents the experience of the GMD in planning the geodetic surveying systems and in the quality control of the observations, and carries on a prospective view of modern trends, such as motorized tachymeters and GPS relative measurements and permanent stations.

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