ABSTRACTS

Optimization of measurements in the geodetic network for monitoring the horizontal deformations of the Rogojești dam

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<u>Abstract</u>

The monitoring of the horizontal deformations of the dams in Romania was done by means of classical geodetic methods of angular measurements and, sometimes, of distance measurements. With the advent of GNSS technology, testing the capability of spatial geodetic networks to meet the precision requirements in monitoring the horizontal deformations of the engineering structures has begun.

The case study was carried out for the monitoring network of the Rogojeşti dam. It is located on the Siret River, 12 km from its entrance in the country, at the communes of Mihăileni and Grãmeşti, being a dam made of local materials.

Optimization of measurements in the monitoring network has been analysed from the perspective of global precision indicators (standard reference deviation) and errors in the horizontal positioning of new points, highlighted by the graphical representation of standard error ellipses. The optimization problems were taken into consideration by both the classic geodetic micro-triangulation network and the modern GNSS network, used either individually or through the horizontal distance components, in a combined micro-triangulation-trilateration geodetic network.

The geodetic measurements made in the 2017 series for monitoring the horizontal deformations of the dam were executed using both GNSS technology and a precise total station. If the beneficiary imposes angular measurements in the horizontal monitoring network, then its accuracy can be improved by optimizing additional observations, which consists in the addition of horizontal distances derived from the GNSS vectors, some of which may even supplement those sight lines that were in lack of visibility.

Finally, it can be concluded that by combining both classical measurements (angular measurements) and GNSS measurements (by horizontal distance determinations), positioning errors can be diminished and an improvement in the geometric configuration of the ellipse errors in the newly determined points compared to the simple network of geodetic micro-triangulation becomes noticeable.