

Section 01. Innovations in Engineering

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Evaluation of the Methods of Improvement of GPS Measurements Quality at the Enterprise Ferrexpo Poltava Mining

Nowadays given the increased requirements it is impossible to carry out of geodetic and surveying works at an adequate level using only classic methods. To meet the requirements of modern technologies applied in geodesy, surveying, land utilization and land cadaster in terms of accuracy and promptness of data acquisition one should apply methods based on using global positioning systems.

Automated control system of mining works based on GIS (geo information system) software K-Mine has been implemented and is successfully operating at the enterprise Ferrexpo Poltava Mining. The measurements are carried out with surveyor equipment using GPS technologies which allows to reduce labour costs and time for works execution resulting in increased labour efficiency.

One of the drawbacks of GPS measurements is lack of total control of measurements accuracy. The accuracy of site positioning cannot be 100% guaranteed either in the field (real-time surveying) or during the in-house processing.

To answer the question how to estimate the methods of improvement of GPS measurements quality, the principles of GPS equipment operation have been studied, and the modes and methods of mine surveying have been analyzed. In the process of study it was found that the quality of GPS measurements can be improved by carrying out the following: selection of optimal equipment set; planning of field survey works, taking into consideration of site specifics; selection of optimal measurement mode, compliance with the technology of GPS measurements; use of specialized software for adjustment of measurements; field and in-house review of measurements; unification of measurements done by GPS receivers with other devices; use of pseudolites; use of differential GPS services.

At present GPS-rovers manufactured by Leica company are used to carry out surveying works at the enterprise. Thanks to these devices there is no need to install temporary and permanent control stations because the device is connected up directly to the global positioning system.

Nevertheless the accuracy of works performed by GPS equipment doesn't always correspond to the stated accuracy due to a number of factors such as selected mode of measurements, non-compliance with the measurement technology, lack of measurement control. To improve the efficiency of the surveying department of the enterprise further use of all analyzed methods is recommended.