

*V. Semeniuk, Master student*  
*A. Panasiuk, PhD in Engr., As. Prof., research advisor*  
*S. Sukhovetska, Senior lecturer, language advisor*  
*Zhytomyr State Technological University*

## **STUDY AND ANALYSIS OF THE ACCURACY OF SURVEYING SUPPORT AND NETWORK DEVELOPMENT**

In designing and developing surveying support and networks, the surveying service is obliged to comply with the requirements of regulatory documents, in particular, the Guidelines for surveying works. Thus, an assessment of the accuracy of surveying works, both at the stage of designing the networks and after the completion of works is made. From a wide variety of ways to develop surveying networks, different enterprises and organizations often prefer to make polygon measurements, geodetic crossbearing, geometric and trigonometric leveling.

At the present stage, electron-optical devices, such as electronic tachometers, as well as satellite positioning systems are increasingly gaining in popularity. The use of electronic tachometers allowed the introduction of methods of creating surveying support and networks both on the earth's surface and in the mine. Such methods were not used because of the great complexity and are based on the overall measurement of the lines lengths and corners. The regulatory framework of the surveying service is updated very rarely, and at this stage it lags behind and does not reflect the changes that have taken place in equipping enterprises with modern measuring equipment.

There are many ways to assess the accuracy of surveying networks. They are based on a strict and approximate equation of measurement results. There are software complex programs that allow performing equation computations and evaluate the accuracy of network elements. But these programs are aimed at solving the problem for specific networks, the diversity and quantity of which is large. It is necessary to develop generalized methods for assessing the networks of different types, which would allow comparing them quickly and optimize their design.

According to earlier studies, several methods for analyzing surveying networks were introduced. One of these methods is the method of mathematical modeling of geodetic crossbearing. This method helped to establish that the main types of geodetic crossbearing can be equated to one geometric scheme. Matrix method based on the theory of parametric equation was introduced for the analysis of the accurate positions of the specified points. Also, this method allowed obtaining formulas which are based on determining the parametric equation. It is used for the estimation of the accuracy of angular, linear and linear-angular crossbearings. In the course of the study, the alignment of the reverse angular crossbearing was performed both in corners and in directions. Besides, it was proved that the alignment in directions in the case of circular techniques is provided only after the deducting the directions of the initial direction averaged value from the results of observations.

General formula for calculating the error of the specified point position and the coefficient values for a single and double crossbearings were equated on the basis of conducted analytical studies. It allows carrying out the operative design of geodetic crossbearings during the development of surveying networks.

Having analyzed mentioned above methods, namely, analytical studies and the method of mathematical modeling, the necessary to combine the existing methods for the effective solution of the problem can be substantiated. It can help to determine the position, angular and linear values, as well as to identify errors with greater accuracy.