EXPERIENCE IN ORGANIZING GNSS-OBSERVATIONS AT THE GEODYNAMIC POLYGONE OF AN OIL AND GAS FIELD: METHODOLOGY, DATA PROCESSING AND ANALISIS

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To ensure geodynamic safety within the scope of their license areas, surveying services of the oil and gas complex create geodynamic polygons. When using GNSS technologies as a method of geodynamic monitoring, the question arises of choosing a coordination technology for a new point inserted into the reference geodetic network. According to a number of regulatory documents, in the development of satellite geodetic networks, only the "network" method should be used, while the "radiant" method is considered unacceptable. The use of the "network" method, as the main one in the organization of GNSS measurements at geodynamic polygons, leads to an increase in the observation time, which is obviously less in the "radiant" method. The authors, using its own Excel-program as a computing tool, they show that the accuracy of the "radiant" and "network" methods is identical. Theoretically, the points of the reference geodetic network of the geodetic construction under study are considered as mathematical constants whose values are not subject to LS-optimization. As an experiment, GNSS measurements were used to bind the new Langepas point, which is part of the network of the regional geodynamic polygon of LLC LUKOIL-Western Siberia, to six reference points of the state geodetic network. Processing of observational materials was implemented using the algorithm of the synthesized version of the parametric method (SVPM) of LS-optimization of geospatial data, taking into account the errors of the coordinates of reference points. The coordinates of the defined point and their average quadratic errors turned out to be, of course, identical in both solutions: "radiant" and "network". This testifies in favor of the theoretically justified use of the "radiant" method, as less laborious in terms of the volume of field work. Additionally, within the framework of the same SVPS algorithm, the GNSS measurements on the specified object were treated as a "free" network. In the latter case, the average quadratic errors ofthecoordinates of the new inserted item sharply decreased. Processing of the same data on the synthesized variant of the correlate method with additional parameters (SVCMAP) again confirmed the results of the "radiation" method.

Keywords: geodynamic monitoring, oil and gas fields, least-squares method, synthesized parametric version of the least-squares method, GNSS technology, radial method, network method, free network, correlate method with additional parameters

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