«Сейфуллин оқулары – 18: « Жастар және ғылым – болашаққа көзқарас» халықаралық ғылыми -практикалық конференция материалдары = Материалы международной научно-практической конференции «Сейфуллинские чтения – 18: « Молодежь и наука – взгляд в будущее» - 2022.- Т.I, Ч.IV. - P. 230-232

METHODOLOGY OF GEODETIC CONTROL OF CIVIL ENGINEERING OBJECTS

Kuanyshbek T.K., 2nd year doctoral student
NCJSC "S.Seifullin Kazakh Agrotechnical University", Nur-Sultan

The most important component of any urban development is the quality of erection of various buildings and structures, as well as the organization and control of all stages of construction for long-term use, which are used in the modern 21st century.

The main requirements to the quality of technical facilities operation, for example first of all, buildings, structures and equipment of civil complexes and industrial enterprises are reliability and safety.

To assess the technical condition of buildings and structures in industries on the basis of experience, categories of structures of buildings and structures have been developed [1].

For each category of states the main defects and damage levels are processed. Using them, the specialist can draw conclusions about the condition of the object of observation by diagnosing the measured parameters and technical control structures (and the geodesist - by geometric parameters).

One of the most important inspections is to check structures for deviations from the design condition and their deformations (control of geometric parameters), which are determined on the basis of geodetic measurements [2].

Geodetic control of geometric parameters that characterize the technical condition of the object is part of the technical control of the technical condition of buildings and structures of industrial enterprises, should be based on the basic concepts and principles of the system of technical control, taking into account the specifics of tasks, means and control conditions.

The system of geodetic control is one of the most important factors in the development of a comprehensive method of problem solving, as well as the application of the principles of adaptation, continuity, dynamics, optimality, standardization, consistency. Comprehensive approach provides maximum satisfaction of the interests of all organizations and enterprises using the results of geodetic monitoring of technical condition - designers, builders, users of buildings and structures, as well as takes into account the main factors affecting the monitoring of technical condition.

With a systematic method geodetic monitoring of the technical condition should be developed as a unified system, the main elements of which are the object, method, means, documentation and control conditions [1].

All methods for determining the deformation of engineering structures are divided into six main groups: monitoring subsidence, horizontal displacements, determining slopes of various high-rise buildings and structures with towers, investigation of the spatial condition of structures, geodetic survey of crane tracks, structural cracks. All these groups combine not only methods and means of measurement, but also methods of processing the results of in-situ measurements, for example methods of determining deformation characteristics [3].

In this regard, the most modern methods of monitoring the condition of buildings and structures are widespread. Geodetic monitoring with electronic total stations is used for new construction or to monitor existing buildings. It is used to control the subsidence of foundations of constructed or under construction buildings on the territory of construction. This type of control consists in geodetic control of vertical displacements (subsidence) of buildings and structures. To do this, deformation (subsidence) marks are installed in the basement along the perimeter of the controlled building and high-precision geometric leveling is carried out on them with high-precision digital levels. The variety of subsidence marks obtained as a result of successive cycles of measurements makes it possible to assume the absolute values of deformations and the rate of their change. In order to create a complete picture of the state of the object of observation, along with the control of subsidence of its base, geodetic monitoring of cracks in the facades of buildings is carried out [4].

Special computer programs are used to obtain data. They are designed for automatic monitoring and continuous real-time monitoring of buildings and structures, excavations, various structures.

One example of geodetic monitoring with the help of an electronic total station was geodetic observations made in the city of Almaty, in the building of the former Ministry of Finance.

The method of measurement with the total station was carried out in the following sequence:

- the total station was placed over the point;
- the instrument was leveled thanks to the use of an electronic compensator, which made it possible to significantly increase the accuracy of leveling;
- the instrument was centered using the integrated laser center which is available on the total station and allows accurate, fast and comfortable positioning;
- atmospheric corrections for air pressure, temperature and humidity were made;
- entered the coordinates of the station point and the instrument height in the appropriate columns of the total station and oriented the instrument;
- enter the reflector height into the instrument and start measuring.

Geodetic measurements of the load-bearing building structures were carried out according to a conventionally defined coordinate system.

The results of geodetic observations showed that the deviation values of the bearing structures of the building are insignificant and do not exceed the normative values according to SR RK 5.03-107-2013, "Supporting and Enclosing Structures", BC 2.01.07-85*, "Loads and Effects".

In conclusion, application of modern devices and techniques for geodetic measurements of supporting structures of civil engineering structures has several advantages, such as:

- timely results of observations of deformations;
- analysis and control of the influence of natural or man-made factors on the deformation process of the controlled object;
- small number of staff to support geodetic work process;
- simultaneous reception of height and plane deformations of controlled object.

In addition, it is better to apply at least a combination of two methods to obtain accurate results [5].

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Supervisor: Associate Professor Toleubekova J.Zh.