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THE ROLE OF STATE GEODETIC BASE NETWORKS IN THE NATIONAL ECONOMY

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Abstract: All types of state geodetic networks are established separately, but they are strongly interconnected and complement each other. Separate points can be common to all types of grids, which allows to solve geodesy, geodynamics and many other problems with high efficiency.

Keywords: Study of the figure of the earth and the gravitational field, determining the movement of the earth's poles, creation of a single, rectangular spatial geocentric or geodetic coordinate system for the whole earth, study of displacement and deformation of lithospheric plates in the earth's crust, determining the position of the reference ellipsoid of the grid countries in relation to the center of gravity of the earth

Introduction

Global geodetic base networks are used to solve scientific and scientific-technical problems, as well as problems of higher geodesy, geodynamics, astronomy and other sciences. Such problems and issues include:

- clarification of fundamental geodetic constants;
- study of the figure of the earth and the gravitational field;
- determining the movement of the earth's poles;
- creation of a single, rectangular spatial geocentric or geodetic coordinate system for the whole earth;
- study of displacement and deformation of lithospheric plates in the earth's crust;
- determining the position of the reference ellipsoid of the grid countries in relation to the center of gravity of the earth;
- due to the dynamics of the earth's surface, to study the laws of change of the coordinates of general geodetic points over time and to bring their exact instantaneous values to a clearly defined period.

The geocentric coordinate system of global geodetic grids should be continuously improved in order to achieve high-precision determination of its "momentary" position. As the accuracy of global geodetic networks increases, opportunities for solving new scientific problems and issues of geodesy, applied cosmonautics, geodynamics, astronomy and many other sciences are gradually increasing.

National geodetic networks, as mentioned above, are divided into three types: state geodetic network (plan), state leveling network (elevation), state gravimetric network.

It is envisaged to determine the planned mutual position of geodetic points at the selected displacement level (reference-ellipsoid or plane) in the state geodetic reference network with high accuracy; the height of network points is determined with relatively low accuracy, especially in mountainous regions.

The state leveling network serves to determine the height of each point relative to the quasigeoid surface with high accuracy; the planned position of these network points is determined approximately on the surface of the transfer.

It is designed to determine the acceleration of gravity at the points of the state gravimetric network with high accuracy; the plan and elevation of these points should be determined with the required accuracy.

State geodetic reference networks established in the territory of each individual country are designed for the following purposes:

- a detailed study of the shape of the earth and the gravity field and their changes over time (within the borders of the country's territory);
- creation of uniform coordinates and height systems in the territory of the country;
- creation of country maps at different scales in a single coordinate and height system.

Solving various scientific and engineering-technical issues of national economy importance by geodetic methods.

All types of state geodetic networks are established separately, but they are strongly interconnected and complement each other. Separate points can be common to all types of grids, which allows to solve geodesy, geodynamics and many other problems with high efficiency.

In order for the geodetic network of the country to be at the level of current and near future requirements, the following is necessary:

- systematic on-site inspection of all points of the network, re-identification and installation of lost points;
- periodically, for example, in the interval of 25-30 years, repeat or perform additional measurements in the most changed part of the network due to modern movement of the earth's surface or other reasons;
- to carry out repeated or additional measurements to increase the accuracy of the state geodetic networks and to further improve them, and to carry out these measurements using high-precision measurement techniques and methods;
- depending on the collection of new measurement data obtained in the results of repeated and/or additional measurements, in a large part of the territory, in the interval of approximately 25-30 years, in order to obtain new accurate values of coordinates and heights related to this period, planned and perform a reequalization of the height grids.

In the construction of modern geodetic networks, it is necessary to carry out complex geodetic works and they consist of the following: design of geodetic networks; reconnaissance; construction of geodetic markers; fixing the underground center and rappers; perform angle and distance measurements; determination of astronomical latitude, longitude and azimuth; performing leveling works; determining the acceleration of gravity; monitoring of earth's satellites, etc. and mathematical processing of measurement results.

Local geodetic networks. In a number of cases, it is necessary to solve complex scientific and scientific-technical issues arising from the requirement to determine the points on the plan according to their mutual position and height in the local sections of the place at any time. In such cases, special networks are established with very high accuracy, and repeated precision measurements are performed in them at specific time intervals. Mathematical processing of measurements in such networks is carried out in the local coordinate system, which is chosen in such a way that the reduction correction for moving from the measured quantities to their projection at the local displacement level is as small as possible. Such networks are used, for example, in the search and prediction of the causes of strong earthquakes, in the construction and operation of powerful radio telescopes, in the construction of elementary particle accelerators and hydroelectric stations.

The main task of designing is to ensure that the developed project option of the geodetic base network meets the regulatory requirements in terms of its accuracy and density of points, and that less money, labor and time are spent on its implementation. The basic regulations and instructions on the establishment of state geodetic base networks are the main leading documents in the design. The basis for designing is the instruction given by the leading enterprise and the area where the work will be performed, the task of the network, important instructions for its construction, and the deadlines for the work.

Construction of geodetic networks includes 3 consecutive stages: 1) collection of necessary data and materials for project creation; 2) development of a graphic drawing of the geodetic network project on maps and drawings; 3) technical and economic substantiation of the project along with the calculation of total financial costs for establishing the network.

The following materials and information about the area where the work will be performed are necessary for designing:

Topographic maps on a scale of 1:100,000 and larger, materials on plan and elevation geodetic networks previously established in this region (network drawings, catalogs, reports), description of physical-geographical and geomorphological conditions, information on hydrological studies. information, information about means of communication, etc. If the collected data does not provide a complete description of the area where the works will be performed, geodetic research will be conducted in the field according to the developed program. The initial materials collected for design should be carefully studied and brought into a system.

Designing is a responsible issue that requires the correct solution of all organizational, technical and economic issues related to the construction of the network. That's why drawing up a technical project and carrying out basic geodetic work is entrusted to specialists with sufficient experience. The design of class 1-2 geodetic networks is actually done on a topographic map on a scale of 1:100000, while the design of class 3-4 geodetic base networks uses topographic maps on a large scale (1: 50000 - 1:10000).

In order to ensure the accuracy required in the construction of the grid, from a geometric point of view, in the grid drawing, it is necessary to pay attention to the following: triangulation and trilaterization triangles should be close to equilateral in shape; that the angles are not less than 40º; (in the central system and geodetic rectangles, some angles are allowed up to 20º); in polygonometry, the roads should be as long as possible.

In state geodetic reference networks, the base sides and the Laplace points determined at both ends of each base side should be located at equal intervals along the network; in order to determine the height of the quasigeoid every 100-150 km, additional gravimetric surveying of the area is planned in addition to the astronomic-geodetic measurements.

Base geodesic networks of different classes are designed in a defined sequence: networks of the highest class are designed first, for example, 1, then 2, 3, etc. When developing a network graphic project, it is important to choose the location of each point.

All points of state geodetic networks should be installed on high (top) places. In this case, firstly, mutual visibility between the points located next to each other at the minimum height of the geodetic marks is achieved, and secondly, the possibility of developing the network in the desired direction in the future is achieved. In all cases, geodetic points should be located in such places that their position in plan and height is kept stable for a long time. 1 class is required in triangulation and polygonometry, taking into account the influence of the external environment on the results of high-precision angle measurement and azimuthal determination, that is, in the southern and desert regions, the visor beam is 4 meters above the obstacle, and in the rest, at least 2 meters above It will be necessary

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