Geodetic and Topographic Surveys in the Construction of Tram Tracks

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ABSTRACT

This article focuses on the design of the first tram track to be built in the city of Samarkand, geodetic surveys, organization and installation of the project, as well as the organization of geodetic work and their accuracy, as well as the selection of the necessary geodetic instruments.

Introduction.

In accordance with the Decree of the President of the Republic of Uzbekistan dated February 1, 2017 № DP-2748 "On measures to implement the project for the construction of tram lines in the city of Samarkand", JSC "Uzbekiston temir yullari" in the city of Samarkand Tram tracks with a total length of 39.8 km are being built in stages / 33.32./.

The total length of the tram track under construction at the first stage of the project is 11.4 km, and to date, the construction of the first part of the tram track with a length of 7.2 km has been completed and serves the tram population.

The next part of the construction is the construction of a 5 km tram line from the railway station to the Siab market serving the population. A tram depot was built at the intersection of Rudaki and Gagarin streets.

On April 15, 2017, the President of the Republic of Uzbekistan Shavkat Mirziyoyev, among the first passengers, traveled by Samarkand tram and arrived by tram with regional activists from the Historical Museum station to the Railway Station station /33.34/.

Aims and objectives of the article. The purpose of the article is to organize and ensure the accuracy of geodetic work in the design of a tram track, geodetic surveys, design movements and installations, as well as the analysis of geodetic and cartographic materials when choosing the necessary geodetic tools and, based on this, the development of appropriate proposals and the scientific justification for their implementation.

Article objectives. Based on the main goal of the study, the following tasks were set in the dissertation:

1. Types and composition of geodetic works in the construction of tram tracks;

2. Accuracy of geodetic works in the construction of tram tracks and methods for their provision;

3. Types of geodetic instruments that provide geodetic work and appropriate accuracy in the

construction of tram tracks.

Main part

Survey work during the construction of the tram track will be carried out according to the following technological scheme:

1. Search to determine the profitability of the road:

a) identify economical road options on a large-scale map;

b) determine the approximate technical characteristics of the road (level, number of lanes, and so on);

v) the study of environmental protection.

2. Select the main route of the path:

a) tracing a camera of road options on a topographic map;

b) study of geological exploration and planning materials of past years;

c) field observation of difficult areas;

d) compare options. Approximate calculation of the volume and cost of work. Choice of the main direction;

e) create a short description of the road project.

Field surveys are carried out by search parties that conduct field surveys, as well as geodetic, engineering-geological and hydrological surveys. During the chamber period, the results of field research are processed. One of the most important geodetic works is the topographic survey of the route, which is carried out every 100-200 meters. When shooting, the position and height of points in the horizontal plane are determined. When surveying, various geodetic instruments are used.

The length of the room is usually measured with 20-meter steel tapes or special measuring instruments. The perpendicularity of the place is determined by the axes, and the horizontal angles by the compass. Simultaneous horizontal, vertical angles and distances are measured by total station theodolites.

Modern long-range light meters and electronic total stations provide high-precision automatic geodetic measurements. Currently, the use of laser theodolites and electronic total stations is widespread.

Engineering and geological work Engineering and geological surveys are carried out to determine the geological and hydrogeological structure of the sections of the future route, the presence and characteristics of various geological processes. These works determine the availability and quality of local building materials, the deformation of the foundations of some structures and their destruction as a result of washing and subsidence. Hydrogeological works study the state and speed of the flow of rivers. These materials are very important in the design of bridge crossings and the design of water pipes.

3. Choose the best path option:

a) Aerial photography of road options on a scale of 1:10000 - 1:15000;

b) construction of a planned and elevated network of foundations in the direction of the route.

c) obtaining an engineering-geological plan;

d) office tracing and design options. Calculate the load. Technical and economic comparison of

options. Choice of a convenient route.

4. Check and agree on the route at the tracing site:

a) transfer of a convenient variant of the route route;

b) large-scale stereo-topographic and topographic survey of the terrain, crossings and intersections, stations;

c) large-scale engineering and geological survey of the route;

d) agreement with land management organizations.

5. Detailed design of the route section:

a) field tracing, as well as alignment;

b) Fixing the starting points of the route in place.

6. Construction of a permanent geodetic base network along the route.

7. Search jobs:

a) engineering-geological surveys of the route;

b) hydrometeorological inspection.

8. Camera work. Create plans and profiles.

Aerial methods are widely used in geodetic, engineering-geological and hydrological works. The main tram works are aerial photography, reconnaissance, aerial photography, aerial geological survey, and aerial hydrometric work. They allow you to reduce the duration of work by 2-3 times. Each aerial survey includes aerial photography or space photography, field work and camera work.

Railway track design methods will depend on the topographic conditions of the site, as well as the ratio of the front and ground slopes.

Conclusion.

This article is devoted to the organization and accuracy of geodetic work in the design of a tram under construction in the city of Samarkand, geodetic surveys, project relocation and installation, as well as surveying, on the basis of which the following conclusions can be drawn:

When creating geodetic bases for the construction of tram tracks, it is necessary to ensure:

- Road fenders are located on the right side of the tram track, the upper part of the ripper is spherically covered, equal to the height of the upper part of the rails adjacent to it, every 20 m on the right side of the track, and every 5 m on the curved part, the measurement error of the angle $m_\beta = 5{,}6''$, in the right direction, $m_{\beta,} = 4''$ in the direction of the curve;
- A leveling network of group IV will be created on the ground, providing a high-altitude connection of 1 km of linear tram tracks.

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