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ABOUT IMPROVING THE METHOD OF PRODUCING LARGE-SCALE TOPOGRAPHIC SURVEYING IN CITIES

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Today advanced Surveying techniques are improving accuracy of measurements of distance, height, area and positional information of an area. Total station is an advanced instrument which is mainly used for measuring horizontal distance, slope distance, remote objects height and area of a land parcel now a days this instrument is majorly used for determining the land area information (1).

Modern GNSS receivers are wide-spread and compact measuring instruments. These devices are constantly being improved in the recent decades. They can provide reliable results when one needs high accuracy in determining the coordinates of points, when a proper measurement method is chosen and performed carefully.

A fundamentally new geodetic instruments and methods of geodetic measurements, such as total stations, GPS geodetic receivers, which are actively used in large-scale topographic survey, were made. It is also important that modern instruments such as total stations is not only more precisely its founders, but largely immune from error removing samples observer (2).

The article considers the improvement of topographic survey methods. At the same time, a topographic survey was carried out on the territory of the National University of Uzbekistan by two different methods. The coordinates of points of clear contours were compared with each other.

Initially, the survey was carried out in RTK mode via satellite observations using a Stonex S900T GPS rover (S902131800700). The reference point was the GPS base Stonex S900T (S902131800713), fixed on the roof of the building of the Tashkent city and regional branch of UzGASHKLITI. In RTK mode, 84 detail points were captured on a GPS survey. 41 of them are clear contour points. The corrections were transmitted using GSM mobile networks.

The survey justification for the total station survey was determined using GPS (figure). The Focus 8 total station was installed at point 2 (T2), found by GPS, and the orientation was made at points T1 and T3. The survey of the situation (solid contours) of the terrain was carried out using the polar method.

Based on the survey results obtained by both methods, a digital terrain model (plan) was created in AutoCAD 2015.

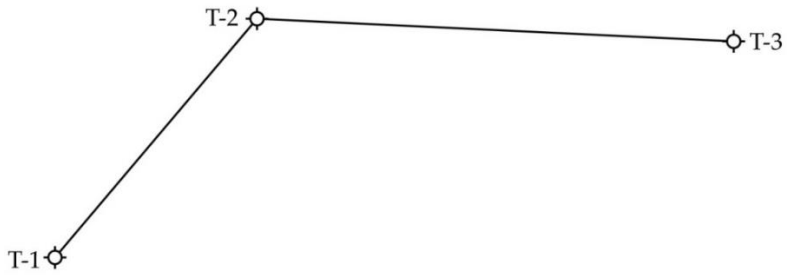

Figure. – Control Network of Total Station

The coordinates and heights of points determined by two different survey methods were compared (Table). At the same time, the total difference in the horizontal position of clear contour points amounted to a maximum of 5.0 cm, and in height - 5.4 cm.

Table. – Difference in coordinates and heights obtained in two different methods

Points	Differences, mm			The overall difference in the plan	Points	Differences, mm			The overall difference in the plan
	Δ*x*	Δ*y*	Δ*z*			Δ*x*	Δ*y*	Δ*z*	
1	-4	18	-13	18	9	2	8	7	8
2	1	2	-8	20	10	-8	-22	-2	23
3	-11	2	-14	11	11	19	33	17	38
4	-1	8	2	8	14	0	17	26	17
5	-5	18	-8	19	25	0	5	-54	5
6	1	25	6	25	35	-18	-2	12	27
7	-4	3	-5	30	38	3	24	-14	38
8	13	24	1	27	39	-13	-48	-27	50

Given the small difference in the coordinates and heights of the exact contour points, GPS surveys can be used in open areas of the city. At the same time, based on total station surveys performed in closed areas of the city, the coordinat of a point in the required density near the work site (in an open area) can be determined by connecting to the Tashkent city system by performing GPS measurements. This allows you to reduce the work associated with creating a traditional survey control and linking it to control points.

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