ISSN NO: 2770-4491
Date of Publication:10-11-2023

Improvement of Methods of Processing Reliable Information in Managing Building and Construction Cadasters

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Annotation. Carrying out the work on the basis of the developed instructions will help to solve a number of problems in the future. One of them is to create objective information about buildings and constructions. Because, the information of the state cadastre of buildings and constructions is initially formed basing on information about the technical parameters of the land plot, buildings and constructions in field conditions. In particular, the initial data will serve as a basis for the future. Therefore, it is very important to correctly form the data obtained in field conditions. For this, it is necessary to follow guidelines created and approved on the basis of established requirements

Keywords. Methods of determining characteristic points of land plots, cadastre of buildings and constructions, reliable information, GNSS technologies, cadastral system

Introduction and analysis of the state of the problem. These days, the state registration of rights to immovable properties, which are part of the state cadastre of buildings and constructions, the main and general surveying works are carried out basing on "GCCINR (Geodetic, cartographic, cadastral instructions, norms and rules)-18-003-96 Guidelines for performing topographical-geodesic and cadastral works during the gross surveying of city and settlement lands"[1] is performed on the basis of normative-legal acts created on the basis of it.

Admittedly, the fact that these normative-legal acts are not up to date has a negative impact on the reliability of the information obtained.

The fact that the methods of determining the quantitative dimensions of buildings and constructions, causes problems such as disproportionate property tax collection and excessive labor costs are not sufficiently covered in the current normative-legal acts.

The accuracy of information about buildings and constructions mainly depends on the correct implementation of field work. After all, information is formed based on the result of data processing. Therefore, in performing such work, the potential of the specialist, the chosen method, and the technology applied on its basis depend on it. Figure 1 below shows the chain of creation of information on the cadastre of buildings and constructions.

[1] Instructions for performing cadastral and topographic-geodetic works during the inventory of land plots assigned to the lands of settlements. "Uzgeodescadastr" (Currently, the Ministry of Economy and Finance). Tashkent. 1996.-43 p.

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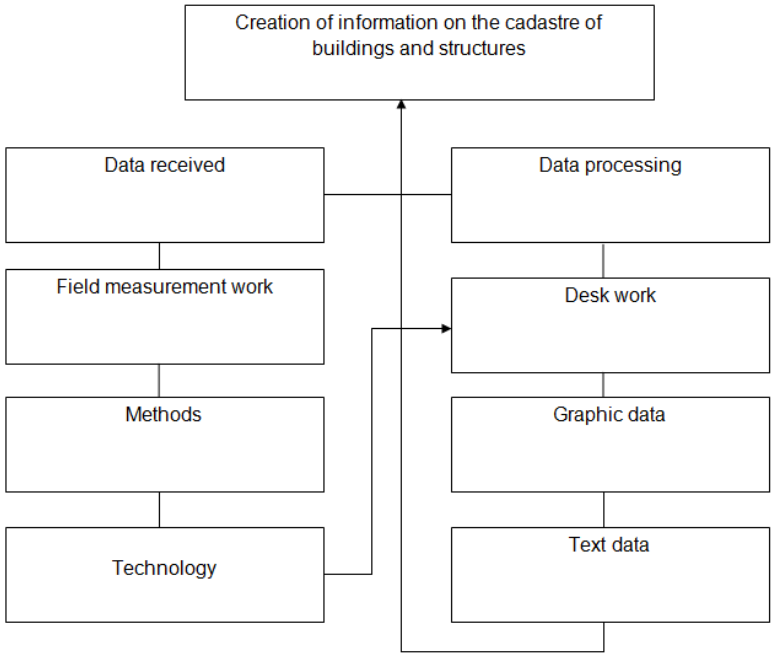

Figure 1. The chain of creating information on the cadastre of buildings and constructions.

It can be seen from the figure above that the initial data is formed according to the parameters of the object in field conditions. In particular, in practice, information, building and construction and their cadastre objects are formed according to the quantity and quality classifications of land plots, buildings and constructions, perennial trees. It should be noted that engineering communications located on the land plot (water, gas, etc.) should also be included in the unified cadastral system. Because the incorporation of information on the location, quantity and quality of engineering communications belonging to the category of real estate in a single information system makes it possible to maintain a multi-purpose cadastre. Implementation of such works requires determining the boundaries of the plot of land on which the object is located. It should be admitted that in practice there are several problems in determining the area of a plot of land, one of them is related to technology, and the other is related to funds.

As a result of the information of the land plot, which is the basis of real estate, the property tax is levied based on the information of the buildings and constructions on it. Such information is the basis not only for fiscal, but also for comprehensive work. Therefore, it is necessary to form correct information about them.

These days, maintaining the cadastre of buildings and constructions in the Republic of Uzbekistan, forming cadastral information about them, is first inextricably linked with maintaining the land cadastre in the country. In this respect, the object of the land cadastre is the only land fund of the republic. It is known that it is divided into the following 8 categories depending on the purpose of application.

As can be seen from the above table created on the basis of the experience of the cadastral system of the Russian Federation, any cadastral works shall be carried out with the specified accuracy by categories according to the main purpose of land use.

In our republic, there are requirements for determining the characteristic points of a plot of land, but they have not been brought into a unified system and do not meet the requirements of the current times. Therefore, it is necessary to have a single normative-legal act embodying the requirements for cadastral works. In this case, taking into account that the land area of our republic is much smaller than that of the Russian Federation, it is recommended that the mean square error in determining the characteristic points of the land plot shall be relatively less.

According to the established main purpose of land use of the land fund, it is necessary to correctly select the cadastral methods and technologies for the accurate implementation of their work after the determination of characteristic points and the creation of a reliable unified system of state cadastres.

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The scientific works of scientists such as S.A. Galchenko, A.A. Varlamov [3.], A.S. Chertovitsky [4.] contain information on the methods of creating cadastral information. According to them, the methods of creating cadastral information are divided into the following:

- geodetic method;
- satellite method;
- photogrammetric method;
- cartometric method;
- analytical method.

According to the results of the analysis, the technology applied in practice based on the geodetic method causes large errors in determining the amount of land plots. Studies have shown that errors are observed mainly in determining the amount of land plots with a complex shape. Therefore, it is advisable to apply the satellite method and the corresponding GNSS technologies from the above-mentioned methods. This not only increases the accuracy of determining the amount of land plots of complex shape, but also brings the mean square error to 0.015 m in determining the characteristic points of land plots of simple shape.

As mentioned above, we should strictly follow its principles, considering that the buildings and constructions are managed in harmony with the state cadastre and land cadastre. One of the main principles of land cadastre management is to cover the entire territory of the republic, and the unity of the method of developing land cadastre data.

It should be admitted that if the proposed method is applied to perform all cadastral works, it reduces the possibility of covering the entire territory of the republic, because such technology is considered expensive, therefore, this technology is used gradually, when performing general cadastral works, at first only the areas of land plots with a complex shape are applied. It is appropriate to use it for identification, and then to use it for all cadastral works after the establishment of private cadastral activities.

Results. In order to increase the accuracy of the cadastral information and objectively collect land and property tax from the customers, it is recommended to carry out the registration of complex land plots in the neighborhood (makhalla). Due to the accuracy requirement of this work, it is recommended to use less expensive dual-frequency GNSS technologies. Cadastre engineers should perform the following sequence (preparation, search, measurement and cameral work) to carry out survey work using such technology (Table 1).

Table 1
The procedure for the application of GNSS technology with the choice of an artificial method for carrying out state registration

№	Definition of sequences	Image of sequences
1	**Preparation works.** In the cadastral database, land plots with a complex shape are identified in the neighborhood section, and the neighborhood (makhalla) map is printed.	

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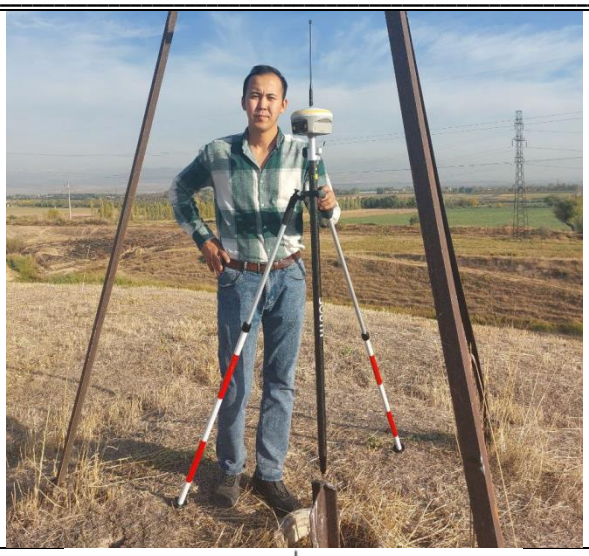
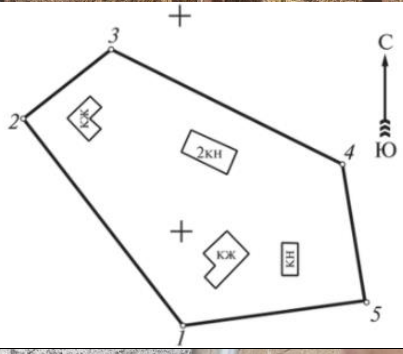
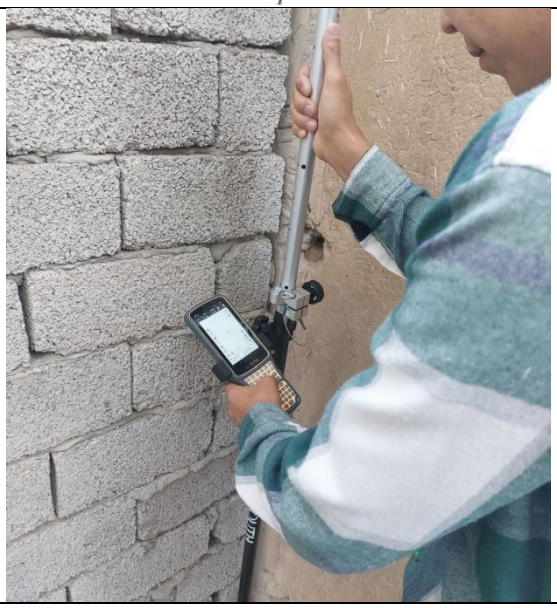
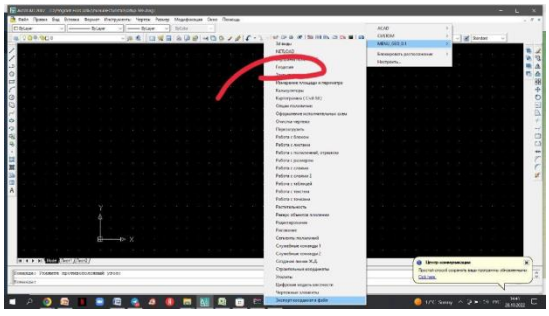
2	**Search works (Reconnaissance).** A geodetic point is determined near the initial plot of land.	
3	**Measurement works.** An image (abris) of the plot of land is formed	
4	**Measurement works.** All characteristic points of the plot of land are determined with the help of a rover.	
5	**Cameral works.** The received data is uploaded to the electronic program and processed.	

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It is possible to increase the reliability of information on complex land plots by carrying out works based on the above sequence. This method was tested on several plots of land located in “Buston” neighborhood (mahkalla) of Kibray district of Tashkent region and was applied to the operation process of the Kibray district branch of the State Cadastre Chamber of the Tashkent Region Department of the Cadastre Agency under the Ministry of Economy and Finance of the Republic of Uzbekistan.

Conclusions. Based on best foreign experiences, it is recommended to establish the requirement to determine the characteristic points on the borders of the land plots according to the categories of the republic’s land fund. On the other hand, it is appropriate to apply the methods and technologies of determining the characteristic points of the borders of land plots based on the established requirements based on the method mentioned in this recommendation. It is recommended to create a register of land plots of a complex shape located in the territory of a certain neighborhood and to determine their areas using modern GNSS technologies based on the target route. This, in turn, creates opportunities for the correct collection of land and property taxes and the provision of legal information during the privatization of land plots.

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