Today, urban planning engineering measures to protect the territory of Tashkent city from stormwater, urban planning analysis and solutions

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ABSTRACT

In this article, the problems of water transfer systems in the cities of Uzbekistan are built on the example of the city of Tashkent.
Possibilities of removing inconveniences caused by high-intensity precipitation of atmospheric water through existing drainage systems and the positive and negative aspects of using water drainage systems with the help of modern technologies in the world experience and their promotion in the territory of Uzbekistan were considered.

Keywords: floods, torrents, surface water flows, sewage networks, slope, heavy rainfall, ditches and drainage channels, precipitation of different intensity.

Introduction:

Today, one of our main goals is to create modern urban and rural residential areas that are fully developed and convenient for the city's residents. As is known, engineering communications play a very important role in the urban, vertical and horizontal growth of cities, in the engineering improvement of their territory, in the provision of comprehensive and general municipal services in the city, in industrial sectors. Protecting the environment of the urban area from pollution and rational use of natural resources are one of the main urgent problems of the present time. The very use of underground engineering networks in urban areas indicates that this area is one of the most complex systems in urban planning.

In particular, the negative effects of various anthropogenic (man-made) impacts on the territory of Uzbekistan, such as climate change (the tragedy of the Aral Sea, blind planning of cities) have a great impact on the territory of Uzbekistan. Heavy rains and sudden changes in flood waters are causing great damage to the urban and suburban areas (blockage of traffic due to complete or partial flooding of the street-road, subway and underground system). It is evident that open and closed drainage systems do not have enough capacity to receive and direct rainwater falling with high intensity. It is not a secret to anyone that in recent years, one of the big cities, Tashkent, is mainly protected from rainwater by only the drainage system of the metropolitan structure.

Main part:

For the city to develop, it must first be supplied with water according to the demand. The irrigation system in Tashkent is distinguished by its very good conditions. The main water supplies of the city are the Buzsuv Canal and the Chirchik River, from which water is supplied to the city residents for irrigation of their gardens and fields through a number of canals such as Kalkauz, Azkazish, Ishkha, Kuvtuvut, Tinchob, Labzak, Ankhor, Shaykhantokhur, and Shawli.

Currently, only the five main canals (Buzsuv, Ankhor, Solor, Karakamysh, Karasu) are operating in Tashkent. We can see that parts of these canals, which are divided into small canals, have completely disappeared or the ends of these canals have been blocked (as a result of the construction of buildings and structures), and their continuity outside the city has not been ensured. We can observe such situations most clearly in the Yunusabad, Chilanzor districts of Tashkent, and around the Otchopar shopping complex. Today, there is no possibility of restoring these old canals at all, and due to the blocked ends, the flooding and accumulation of water in the city's streets, subways, basement buildings, and underground structures has become one of the most urgent problems of the day.

In particular, from the ecological point of view, various wastes mixed with snow and rainwater and flowing through the city, and their insufficiently treated or not treated wastewater being thrown into water basins and not going outside the city, the accumulation of these waters in the city's street-road network and territories, water resources and available leads to pollution of the territories. Microorganisms that cause various diseases appear in water bodies and in the territory due to the rapid decay of organic substances in wastewater.

Since time immemorial in the cities, the maintenance and use of the water system (canal and ditch) in the urban area is of particular importance in the engineering improvement of the urban area. In the city, these engineering networks ensure that the city is fully alive. It serves to meet the general household utility and industrial requirements of the city.

In Uzbekistan, there is a large amount of precipitation in the spring season, which leads to the emergence of floods, the destruction of the landscape and geographical conditions, the infrastructure of the city.

Urban flooding, caused by rising river levels as a result of heavy rain or heavy snowmelt, is common throughout the world. In the conditions of the cities of Uzbekistan (Tashkent, Samarkand, Bukhara) located in the hilly relief of arid zones, floods and floods occur as a result of changes in the properties of the urban landscape and surface covering. Thus, the development of urban infrastructure can increase the risk of flooding due to heavy rainfall.

A number of measures aimed at improving the ecological situation, preventing emergency situations during floods and torrents, protecting population and social objects, economic sectors from the negative effects of dangerous natural phenomena, as well as improving the monitoring and forecasting system of natural disasters are being implemented. Studies aimed at the study and mapping of possible flood zones in cities, as well as the determination of their territorial distribution characteristics, remain necessary and relevant.

Today, the operating part of these networks in the territories located in Tashkent is under the power of Kamoliddin Fayzullaev. According to him, 60 km of drainage, 206 km. collector, 533 km of canals and canals, 1213 km of irrigation networks have been determined. Another 18 km of structures were found to be operating storm drainage structures.

According to the expert of the General Department of Improvement of Tashkent city, they alone have 1500 km of constructions on their balance sheet.

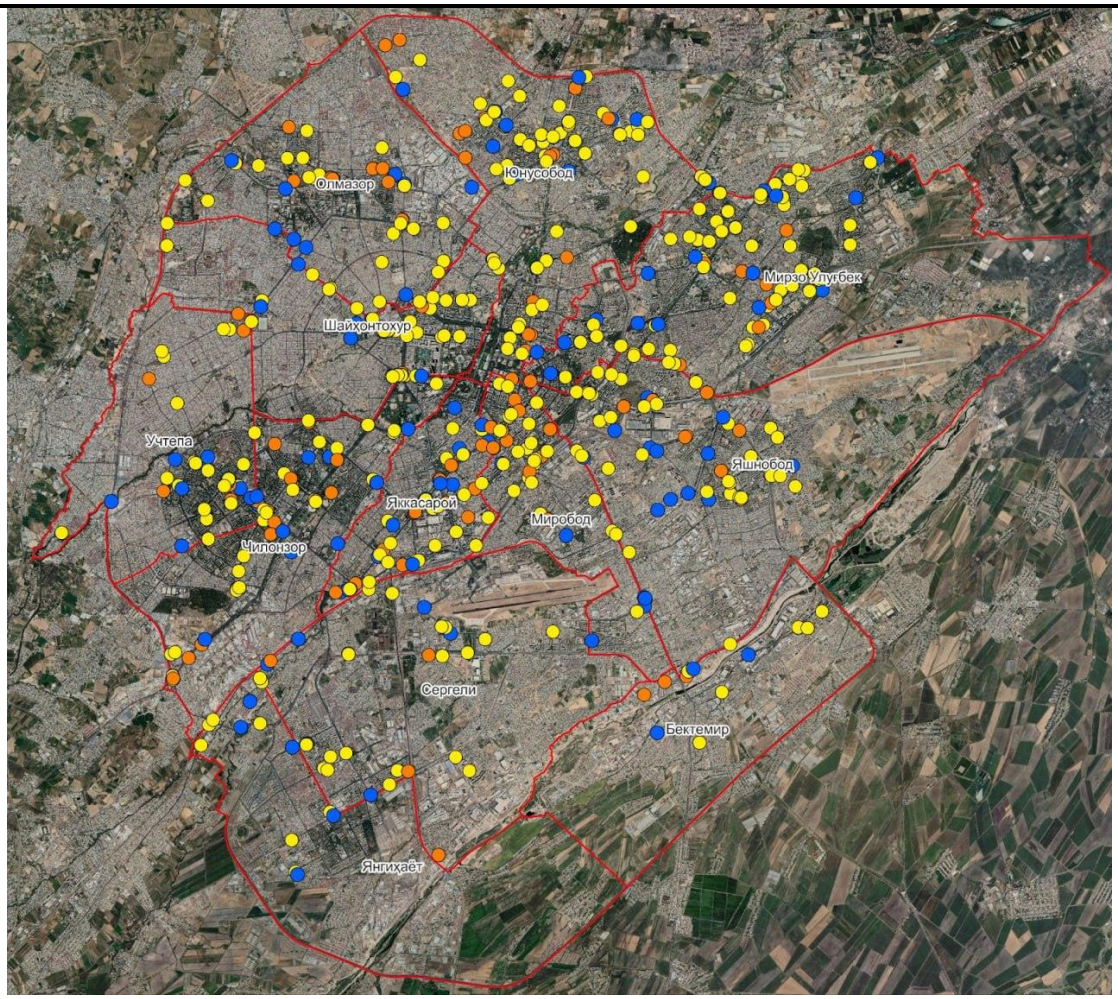


Figure 1. Places flooded by heavy rains in Tashkent: Brown color in 2022, yellow color in 2023 - orange color

As a result of heavy rainfall across Uzbekistan in April 2019, the amount of rainfall in March-April was twice the long-term average in many areas. The maximum amount of precipitation per day is 30 mm. exceeded Heavy rainfall has led to emergency situations in the cities of Uzbekistan, especially in Tashkent, Samarkand and Bukhara.

On April 9, 2019, a large amount of water accumulated on the streets of Bukhara due to prolonged heavy rainfall. On April 23-24, 2019, the streets and sidewalks were flooded in many areas as a result of the heavy rainfall in Tashkent.

The infrastructure of cities is determined by the growth of areas occupied by administrative buildings, residential complexes, the length of roads, sidewalks and other buildings that prevent rainwater from filtering into the soil. The relief has changed due to the construction of various buildings in the area, for example, towards the center of Chorsu square, the relief has decreased on the asphalt roads on almost all sides, which ensures that the water flows quickly into the void and the depression and quickly fills the void. The growing urbanization of megacities with millions of inhabitants cannot be stopped, but urban hydrology must be considered and developed. In addition to the construction of buildings, structures and roads around the road, it is necessary to build storm drains, in the example of the city of Tashkent, these are ditches and drainage channels, which are used as irrigation systems for the improvement of areas in the summer.

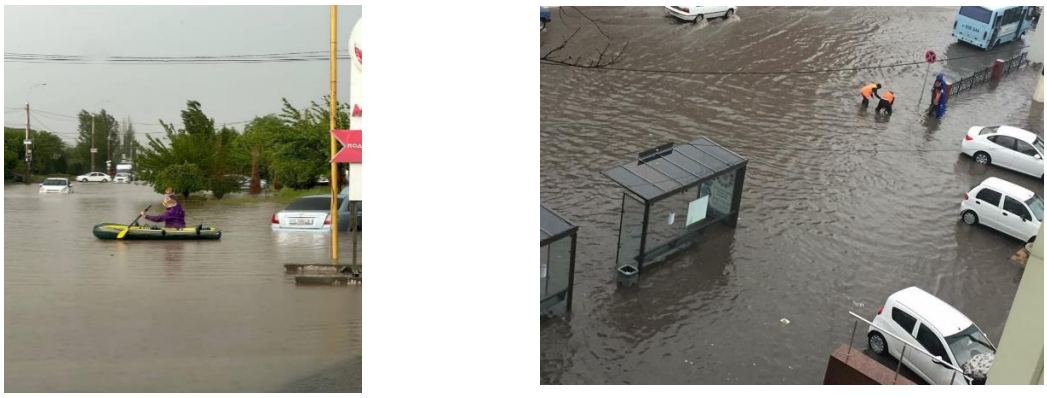
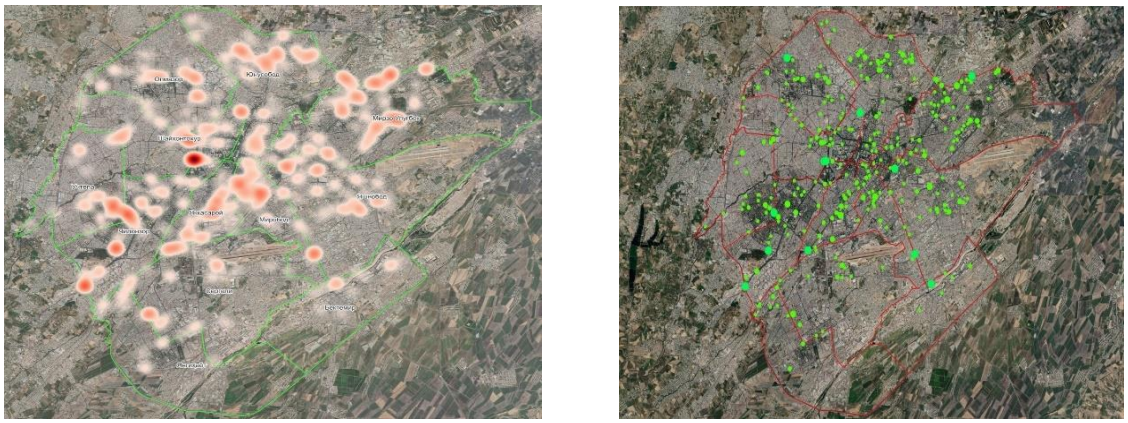


Fig. 1-2. Territory of Shaikhontohur district. Subsidence of highways of Tashkent and adjacent areas due to heavy rains.

Changes in urban landscapes lead to hydrological changes in flood-prone areas. The construction of roads and buildings reduces the filtering properties of the watershed and increases the speed of surface water flows.

The growing urbanization of cities, especially megacities with millions of inhabitants, cannot be stopped, but urban hydrology must be taken into account and developed. In addition to the construction of roads and buildings, construction against storm debris is also necessary.



Picture 4-5, the general area of Tashkent. The colors clash and the larger the area, the larger the flood.

It is necessary to know the possible flood zones of cities in order to prevent emergency situations in cities caused by rainfall of different intensities. We can see from the above pictures that protection of some districts of Tashkent city from floods is an urgent problem. Maintaining the existing network of ditches and canals in the city is beneficial during periods of high rainfall intensity.

As a result of the closure and disappearance of the existing network of ditches and canals in the urban area, it creates obstacles to the outflow of atmospheric and rainwater along the slope. As a result, the infrastructure of the city and the population were inconvenienced.

Figure 6-7 The area near the Abu Sakhi market in the Chilonzor district.

Until 2015, there was a channel in place of the green lines, but it was filled or buried during construction. As a result, during the rains, there is an irregular yuuza. We can observe such areas in several places of the city.

Today, as a result of the large amount of seasonal precipitation in these areas, atmospheric water accumulates and affects the infrastructure of the city.

Figure 8. The territory belonging to Mirzo Olughbek district. Orange line - household sewage line, green line - concrete structures, red line - storm sewer pipe.

From the given information, we can observe that some areas of our city are blocked by engineering networks and the failure of the sewage system.

Conclusion:

In the process of engineering construction, taking into account the anthropogenic changes in the urban landscape and the changes in the urban infrastructure, it is necessary to determine the areas of changes in the speed and direction of the water flows formed in the catchment areas. In particular, it is necessary to stop the growing urbanization of cities, to take into account the fact that it is impossible to become a multi-million megalopolis, and to develop urban hydrology. The existing network of ditches and canals in certain cities are considered the lifeblood of cities. In addition to

the construction of roads and buildings, in the city they are used as ditches and drainage channels, irrigation systems for landscaping in the summer.

The accumulated experience is used in the design of large cities. Due to our harsh continental climate, it is necessary to improve the system of ditches and canals.

- study the condition of the territory and preserve the existing ditches and canals;
-redesign of water drainage networks;
- it is required to take into account such features as the improvement of the closed drainage system.

Due to the significant urbanization of large cities, special attention to the field of urban hydrology is used in the design of the development of urban infrastructure in large cities.

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