

RESEARCH OF OGHASKURA RIVER BED PROCESSES AND RELATED CIRCUMSTANCES UNDER THE NATURAL CONDITIONS

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Abstract. The thesis presents the changes in the bed processes of the River Oghaskura over the years and the research results of the work carried out in nature by the expedition in 2023.

The riverbed processes caused by the river are discussed as a result of Oghaskura floods and flash floods, which cannot pose a large-scale threat to Kutaisi however, they still pose certain problems for Kutaisi.

The continuation of the bad conditions and problems that are still ongoing in the river have been researched in the Oghaskura bed. Due to its narrowing and damage caused by the dumping of construction and other types of household waste.

Key words: River Oghaskura, riverbed processes, floods and flash floods, narrowing of the riverbed, concreting of the riverbed, siltation of the riverbed.

1. Introduction

The river Oghaskura is the same Oghaskura river in western Georgia the river Gubistskali tributary. It originates on the southern slopes of Mount Sataflia, crosses the northwestern part of the city of Kutaisi, passes through the settlement of "Avtokarkhana" (mostly in an artificial bed), then in Partskhanakanebi and joins the river Gubitskali village in 3-4 km from Kutaisi. The length of the river is 22 km. It is being fed by atmospheric precipitation and ground water. In case of heavy rainfall, it is characterized by floods, which creates a danger of flooding the streets of densely populated areas of Kutaisi.

It is obvious, that the Oghaskura river, which originates in Sataflia mountain and flows in the north-western part of the city, cannot pose a large-scale threat to Kutaisi, although it still presents certain problems, an example of which occurred in the not-so-far past. In November of 2017, bad weather created problems in Kutaisi -

as a result of heavy rain, the River of Oghaskura overflowed its bed. The rushed water flooded Bukhaidze Street and the surrounding area. Water entered the basements of residential buildings and shopping facilities. Despite the scale, economic damage was caused to the population.

Main Part

The bed of the River Oghaskura within Kutaisi is heavily polluted with household, construction and other types of waste. At first glance, the seemingly calm and harmless small mountain river Oghaskura overflows its bed during the rains and floods the entire settlement long the river (Find, fig. 1), which poses a danger to the settlements.



Fig. 1. The river Oghaskura in Kutaisi overflowed the bed and partially flooded Bukhaidze Street.

In order to regulate the sedimentary processes of the river Oghaskura, Kutaisi City Hall is announcing a tender (NAT 230018001) for the preparation of the design and cost accounting necessary for the rehabilitation. The procurement price is equaled to GEL 38,000.

According to the tender documents, the project should be prepared for the reconstruction of the sections located along Daniel Chonkadze and Automshebeli avenues (Find, fig. 2). The goal of the project is expansion - cleaning of the river Oghaskura bed, the strengthening of the river banks with monolithic concrete, during heavy rainfall, the river Oghaskura in order to reduce the risk of flooding the surrounding area of Oghaskura.



Fig. 2. In Kutaisi, the reconstruction of the river Oghaskura bed and the bridges on it.

In 2018, in Kutaisi, concrete works were carried out in the River bed of Oghaskura. There is talking about the section of the river that flows in the vicinity of the former parliament. The bed was concreted in order to prevent the accumulation of waste and stones in the river. Concrete embankments will also be built along the river.

Concreting the bed of Oghaskura river, on the one hand, will facilitate the rapid flow of water in the river bed and on the other hand, the concrete dams will protect it from flowing out of the bed.

Due to sand and bottom sediment accumulated at different times (Find fig. 3), the river bed was reduced to 3-4 meters in width, now it will expand to 7.0 meters, which means that it has returned to the old mark. In addition, one meter of land was cut in the bed of Oghaskura river so called the bed depth increased by one meter.



Fig. 3. In Kutaisi, in front of "Hualing" at street of Automshebeli during the conducting the cleaning works of Oghaskura River.

Hydrological observation in nature was performed from April 27 through May 1, 2023. at the adjacent section of Kutaisi Automshenebeli Street No. 43 on the river Oghaskura.

Within Kutaisi, separate sections of the riverbed of Oghaskura are very well cleaned, which is clearly visible (Fig. 4).



Fig. 4. View of the River Oghaskura upstream, from the metal bridge, to the point of outflow from the artificial bed

On the section of the artificial iron-concrete wall on the left bank of Oghaskura River, as a result of hydrological observation, the depth of flow is $h = 16.0$ cm, the height of the embankment wall is $H = 2.31$ m. The average speed of the stream movement is 0.70 m/s, the flow rate of the stream is 0.804 m³/s. The existing pipeline is $H = 2.56$ m away from the bottom of the river bed and it is higher than the existing reinforced concrete wall of the bank.

The end part of the artificial reinforced concrete wall.



Fig. 5. Is presented on April 27, 2023, at the moment of measuring the water level of the left bank of the river Oghaskura and at the reinforced concrete bridge connecting the right and left banks of Oghaskura.

The figure 5 shows the cross-section of Oghaskura with the reinforced concrete bridge connecting the right and left banks, as a result of hydrological observation in nature, the depth of the flow in the said section is $h = 16.0$ cm, the height of the embankment wall is $H = 2.31$ m. The average speed of the stream movement is 0.67 m/s, the flow rate of the stream is 0.804 m³/s.

The river flows from an artificial reinforced concrete bridge, the dimensions of which are length $L = 6.5$ m, height $H = 1.9$ m. Then the river flows into an artificial bed.

The river when it flows from the artificial rectangular reinforced concrete bridge. During the measuring hydrological works, we have determined that the water level at the right bank is $h = 16$ cm, the height of the bank is $H = 2.2$ m (Find, fig. 5) the average speed of the stream movement is 0.67 m/s, the flow rate of the stream is 0.804 m³/s.

At the end of the artificial reinforced wall of Oghaskura river right bank, the depth

of the flow is $h = 15.0$ cm, the height of the embankment wall is $H = 3.0$ m. A small section of the bank on the extension of the reinforced wall of the river right bank has been washed

away. The average speed of the stream movement is 0.71 m/s, the flow rate of the stream is 0.804 m³/s. The river at the metal bridge on the right bank of Oghaskura bed, water level $h = 18.5$ cm, bank height $H = 3.08$ m. The average speed of the stream movement is 0.67 m/s, the flow rate of the stream is 0.804 m³/s. As can be seen from the picture (Find fig. 6), the right bank of the river Oghaskura is higher than the existing metal bridge, $H = 3.34$ m. The length of the metal bridge construction is $L = 9.4$ m. (Find fig. 6. Oghaskura River at the metal bridge ($L = 9.4$ m.), at the time of water level measurement).



Fig. 6 Iron bridge of river Oghaskura.

Picture 6 shows the left bank of the river Oghaskura. The water level of the left bank measured at the metal bridge is $h = 23.0$ cm, the height of the bank is $H = 3.08$ m. The average speed of the stream movement is 0.76 m/s, the flow rate of the stream is 0.804 m³/s. The lower height of the metal bridge from the river bed is $H = 2.6$ m.

The change of the bed processes of the river Oghaskura over the years and the results of the works research carried out in nature by the expedition in 2023.

Table 1

Nº	Location of performance of work	The depth of water in the river. CM.	The depth of bank of river. M	Length and depth of the bridge over the river. M.	Depth of the bank of the bed. M	Average speed of stream/discharge m/sec/m ³ /sec
1	Completion of the left bank of the reinforced concrete wall	16.0	2.31	6.5/1.9	2.56	0.70/0.804
2	Left bank, completion of the bridge	16.0	2.31		2.31	0.67/0.804
3	Right bank, completion of the bridge	16.0	2.20		2.20	0.67/0.804
4	Completion of the left bank of the reinforced concrete wall	15	3.0		3.10	0.71/0.804
5	The right bank of the iron bridge on the river	18.5	3.08		3.34	0.67/0.804
6	The left bank of the iron bridge on the river	23.0	3.08	9.4/2.6	3.08	0.76/0.804

Flow velocities in the bed of Oghaskura River were studied by the method of using floats, from the bridge crossing to the metal bridge, float series groups were run in the bed. As a result of research the water flow movement of Oghaskura River, it was determined that the average speed of the river flow was equaled to $V_{average}=0.67$ m/s, liquid consumption $Q=0.804$ m³/s.

Conclusion.

1. Oghaskura River is a mountain river by its origin and like all mountain rivers it is characterized by severe floods and torrential circumstances, which are specific for all rivers and require individual study in nature.
2. All the work done by Kutaisi city hall and the government of Georgia over the years. It is a step forward for the regulation of Oghashkura riverbed processes and the reduction of risks for the population protection.
3. The research of the available materials on Oghaskura River, the survey of the local population, observations in nature

and hydrological calculations allow us to conclude that the research of floods, water flows and bed processes under natural conditions should be continued on the entire Kutaisi section of the river. In order to protect the population from the dangers caused by floods and flash floods losses. In order to reduce the security risks of the population.

Reference

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