Analysis results of data obtained in natural field research in mountain river Sokhsoy

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Abstract. Forecasting and preventing silting of hydraulic structures, irrigation canals, and reservoirs, as well as improving methods for maintaining their throughput, is particularly important. In this regard, special attention is paid to research work aimed at improving hydraulic calculation methods, taking into account the variability of channel factors in the design and construction of hydraulic structures planned for construction. This article analyzes the factors influencing the occurrence of the deformation process in the channels based on the information obtained in the natural field conditions.

1 Introduction

River sediments are the main factor in the assessment of riverine processes. The movement of river sediments in the riverbed, channel, hydrotechnical structures, and agricultural fields can be observed as a type of global circulation in nature. One of the important issues is the assessment of processes in the river basin and the improvement of computational methods and technologies for the prediction of river deformation. In this regard, in the assessment of the processes of the river, special attention is paid to scientific research on the prevention of turbidity of hydraulic structures in the riverbed and canal [1, 2, 3].

One of the peculiarities of pre-mountain rivers is that the slope of the riverbed is high. The processes taking place in the Sokhsay river basin in the Sokh river basin were analyzed. During the research: The morphometry, flow rate, and turbidity of the Sokhsay river were studied.

The effect of sediments in the foothills on the change of hydraulic elements of the structure has been studied for many years [4-7]. One of the main influencing factors in assessing river basin processes is river sediments. However, the problems of analyzing the mechanical composition of sediments and determining their characteristics of sediments have not been fully resolved. The research will be needed to study the mechanical composition of sediments in pre-mountain rivers and to assess their impact on river formation.

2 Methods and materials

It is known that river sediments consist of suspended and deep sediments. Natural field studies have been conducted to study the amount and composition of sediments in the Sokhsoy River, which receives water from the Sarikurgan hydroelectric power station.
Several pickets were selected to determine the amount of sediment in the Sokhsoy riverbed, and the dynamics of the riverbed was studied at these pickets (Figure 1).

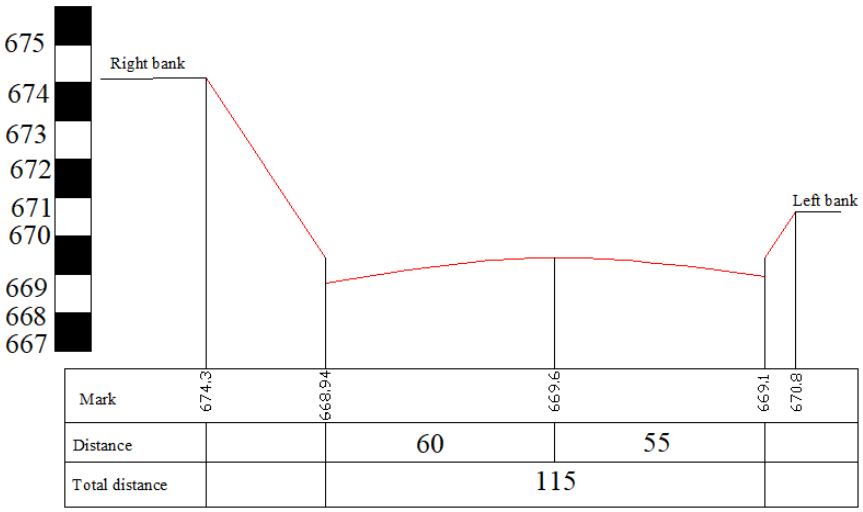

Fig. 1. Process in Sokhsoy river PK-12

The studies studied the amount of suspended and bottom sediments, their fractional composition, and their variation along the length of the stream. The study obtained information on the distribution of sediments by pickets (Figure 2).
Soxsay valley was divided into several storks. The parameters of each target were analyzed during the year.

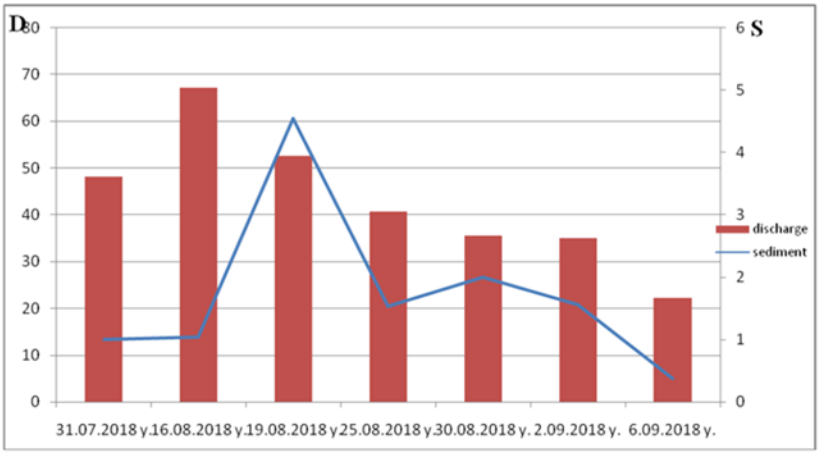

Fig. 2. Schedule of dependence of sediment flow with water discharge

According to the research results, the fractional composition of suspended sediments for pickets in the Sokhsay River is given in Table 1. The analysis shows that the main part consists of particles with a diameter of 0.1-0.05 mm and 0.05-0.01 mm; their total share is 68.9% and 27.6% (Table 1).

Table 1. Fractional composition of sedimentary particles in the Sokhkoy valley

№	Sampling point	Sediment diameter (mm), in%				
		1.0-0.5 mm	0.5-0.25 mm	0.25-0.1 mm	0.1-0.05 mm	0.05-0.01 mm
PK-12	The beginning of the Sokhsoy	-	4.6	17.64	62.95	4.81
PK -22	The middle part of Sokhsoy		2.52	16	71.39	10.09
PK -92	The last part of Sokhsoy river			7.4	32.39	59.61

3 Result and Discussion

According to the analysis of the fractional composition of river sediments, in PK-12, 0.5-0.25mm diameter particles were 4.6%, 0.25-0.1 mm diameter particles were 17.64%, 0.1-0.05mm diameter particles were 62.95%, 0.05-0.01mm diameter particles were 4.81%. , In PK-62, 0.5-0.25mm diameter particles are 2.52%, 0.25-0.1 mm diameter particles are 16%, 0.1-0.05 mm diameter particles are 71.39%, 0.05-0.0 mm diameter particles are 10.09%, the composition of sediment at the end picket of the Sokhsoy river the fraction varies as follows: in PK-92, particles with a diameter of 0.25–0.1 mm account for 7.4%, particles with a diameter of 0.1–0.05 mm account for 32.39%, and particles with a diameter of 0.05–0.01 mm account for 59.61%. Although the composition of sediments on the pickets is variable, their main part consists of sediments of 0.1 and 0.05 mm (Fig. 3).

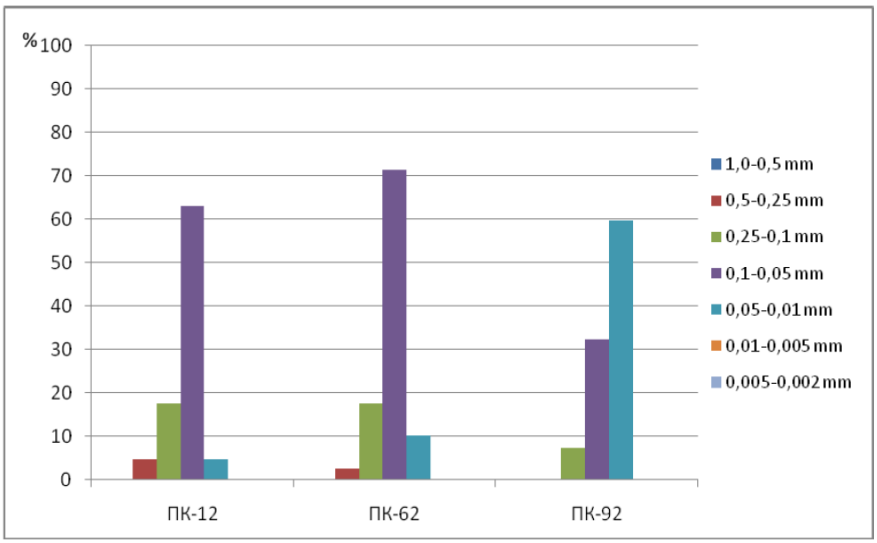

Fig. 3. The fractional structure of the sediments in the Sokhsoy bed by the PCs

It is clear from the above analysis that the complexity of the processes taking place in the river is explained by considering many factors. Sediment analysis suggests that sand particles are flowing into the lower part of the Sokhsoy River, which hurts the operation of the hydropower plant. There is a problem with additional work at the hydropower plant.

It is necessary to change the hydraulic parameters of the Sokhsoy River so that the sediments coming with a certain amount of flow can be trapped in the river itself.

4 Conclusion

There are special characteristics of sediment movement in the mountainous part of the river, which is different from the movement of sediments in the plain part of the river. It was found out from the conducted analyses that in determining the solid flow consumption in Mountain Rivers, it was justified to consider the composition of sediments, taking into account other factors.

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