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***Mirzaev M.***

***Bukhara Institute of Natural Resources Management, PhD student***

***Inomov D.***

***Bukhara Institute of Natural Resources Management, PhD student***

***Ibragimov I.***

***BINRM "Hydraulic structures and pumping stations" department associate professor, Ph.D.***

# ROUGHNESS COEFFICIENT IN THE GENERAL EROSION AREA

***Abstract:*** *Hydraulic calculations of riverbeds are carried out during the design of hydrotechnical structures on the river. The calculation sets the main parameters of the channel: width, flow depth, radius of curvature of the channel, etc. Hydromorphological relationships are used to calculate channel width, flow depth, and channel radius of curvature.*

*The hydraulic resistance coefficient increases as a result of an increase in the roughness of the tube. The hydraulic resistance coefficient is not only independent of the Reynolds number, but also depends on the absolute roughness of the tube.*

***Key words:*** *erosion, hydromorphological, water consumption, liquid speed.*

Tuyamo'yun hydrodam is located in the area of general erosion. Figure 1 shows the relationship between the turbidity coefficient and water flow in the Tuyamo’yun section for 1988. As can be seen from the graph, there is no relationship between "n" and "Q", the turbidity is between 0.015 and 0.043, and the flow rate is between 200 and 3000 m3/s. The Tuyamo'yun section is located under the reservoir, and general erosion and deepening of the river bed is observed, i.e. an intensive process that affects the preservation of the undulation of the river bed regardless of the increase in water flow in the river.

A plot of the n=f(Q) relationship for the high water year 1992 is shown in Figure 1. Here the roughness coefficient "n" is from 0.016 to 0.03 at low flow and from 0.03 to 0.04 at flood, i.e. with the increase of water flow in the river, the roughness coefficient increases.

In 1998, with high water, it was again established that there is no connection between the Ghadir-budirlik coefficient of the river and the water flow. In 1998, the Ghadir-budiry coefficient ranged from 0.018 to 0.058 at low flow and from 0.02 to 0.04 at maximum flow in the river. Fluctuations in the roughness coefficient are greater during periods of low water than during periods of flooding.

The relationship n=f(Q) in 2005 turned out to be satisfactory. This year, with the increase in water flow, a relationship was found that shows a decrease in the roughness coefficient. The roughness coefficient is from 0.026 to 0.04 at low flow, from 0.025 to 0.03 at maximum flow.

n= f (Q) the relationship looks like this:

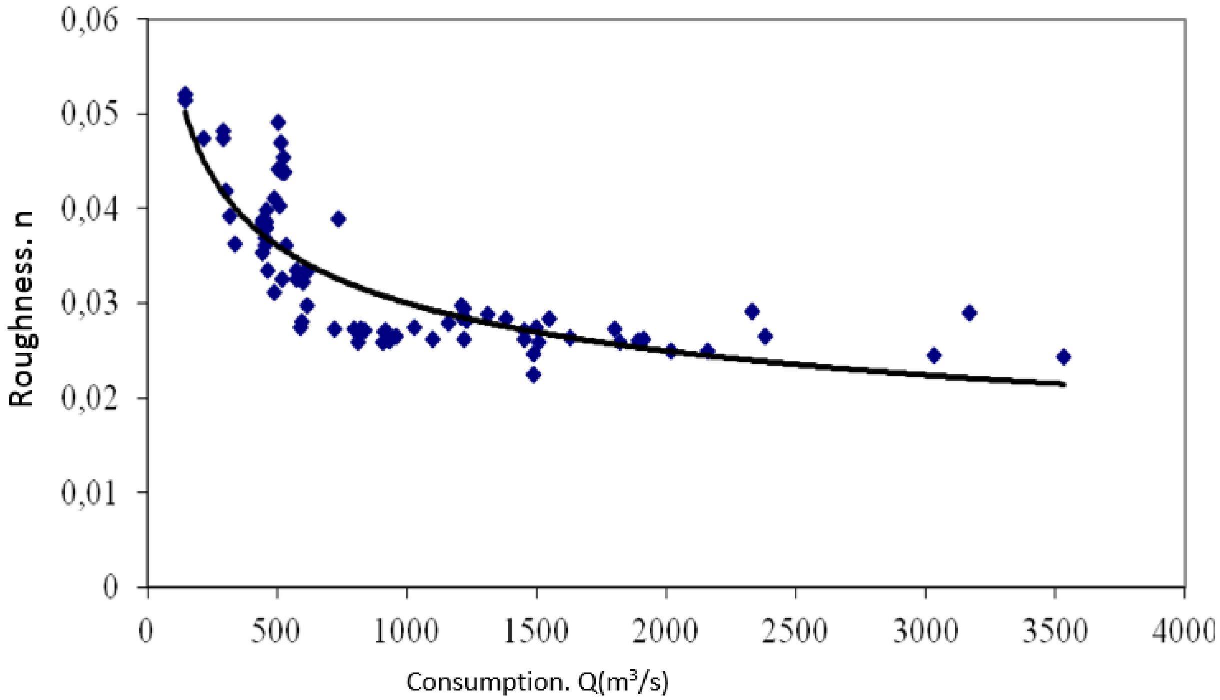
$$n = \frac{0{,}063}{Q^{0{,}101}} \tag{1}$$

The correlation between the Ghadir-budirlik coefficient and water consumption in 2010 is satisfactory. The relationship between the turbidity coefficient has been improved. Here, the coefficient of turbulence varies from 0.023 to 0.074 at low flow and from 0.025 to 0.035 at maximum water flow in the river.

The n=f(Q) relationship improved in 2012 compared to 2005 and 2010. This year, the roughness coefficient changed from 0.027 to 0.053 at low flow and from 0.022 to 0.03 at maximum flow. The relationship n= f (Q) has the following form:

$$n = \frac{0{,}178}{Q^{0{,}26}} \tag{3.3}$$

The n=f(Q) relationships for 2005, 2010, and 2012 show that the coefficient of turbulence decreases with increasing flow velocity, and the relationships are indicative of these three high water years.




1- picture. Graph n= f(Q) Tuyamo’yun.

In 1988, 1992 and 1998, there is an unsatisfactory relationship between the turbidity coefficient and water flow. It is explained by the intensive channel process that occurred in this section, which led to the general erosion of the channel and the decrease of the average bottom elevation. Satisfactory communication in 2005, 2010 and 2012 shows that the intensity of erosion along this section has now started to decrease and stabilization of the channel process has begun.

As it can be seen from the analysis of graphs of connection n= f (Q) for the Tuyamo'yun hydrostation, three different types of changes of the Ghadir-budiry coefficient are observed with the increase of water flow in the section.

1988 and 1998 belong to the second type, ie. with the increase of the water flow in the river, the Ghadir-budiry coefficient remains unchanged.

1992 belongs to the first type, ie. with the increasing flow of water, the coefficient of friction increases.

2005, 2010 and 2012 belong to the third type, ie. with increasing water consumption, the Ghadir-budiry coefficient decreases.

Thus, although the intensity of channel erosion has decreased in the Tuyamo'yun section, the channel process has not yet stabilized, and a satisfactory relationship between the Ghadir-budirlik coefficient and the water flow through the section has not been found.

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