INFLUENCE OF BUCKET MOVEMENT ON QUALITY OF CLEANING PROCESSES

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The article is devoted to one of the most important problems of mechanization of reclamation work - the state of reclamation systems and ensuring the high quality functioning of irrigation canals. The process of exploitation of reclamation canals is accompanied by a decrease in the living cross-section and is a consequence of the deposition of sediment and siltation, which in turn negatively affects the throughput. An explanation is given of the influence of bucket movement on the quality of cleaning in the work process. It is indicated that the minimum diameter roller should be located close to the blade. The qualitative indicator of canal cleaning can be assessed by the following coefficients: the coefficient of restoration of the sub flow capacity of the canal and the volumetric coefficient of sediment removal (in production this is called the cleaning coefficient). When studying technological processes, the following issues were investigated in the communication system of a wide-cut dump-type bucket with sediment: study of the kinematic processes when cleaning a channel from a wide-cut dump-type bucket and determination of the characteristics of the influence of various factors on them. Improving the quality of canal cleaning by studying the possibility of adjusting the trajectory of a wide-cut dump-type bucket during sediment digging to the perimeter of the canal section in a rollerless and roller version. The average population indicators obtained for individual sections of the canal were assessed by comparing them with the results of theoretical studies.

1. INTRODUCTION

When cleaning canals from sediments with single-bucket general-construction excavators, it is advisable to use buckets with a larger capacity. Taking into account the fact that the density of sediments and the resistance to their digging are low, the stability of excavators during operation is not impaired. To clean the channels, you can use a special wide-cut dump-type bucket mounted on two rollers. The purpose of the roller bucket is to prevent damage to the concrete pavement lining [1].

When observing the movement of the rollers, both rolling and sliding occur in them. Rocking and sometimes slipping can occur both when the bucket is loaded and when it is empty. It should be noted that all these processes are carried out by means of a single hydraulic cylinder located on the handle of the excavator, which moves a bucket built on rollers. In this case, the hydraulic cylinder changes the position of the bucket to an angle of 120° and fills it with soil sediment.

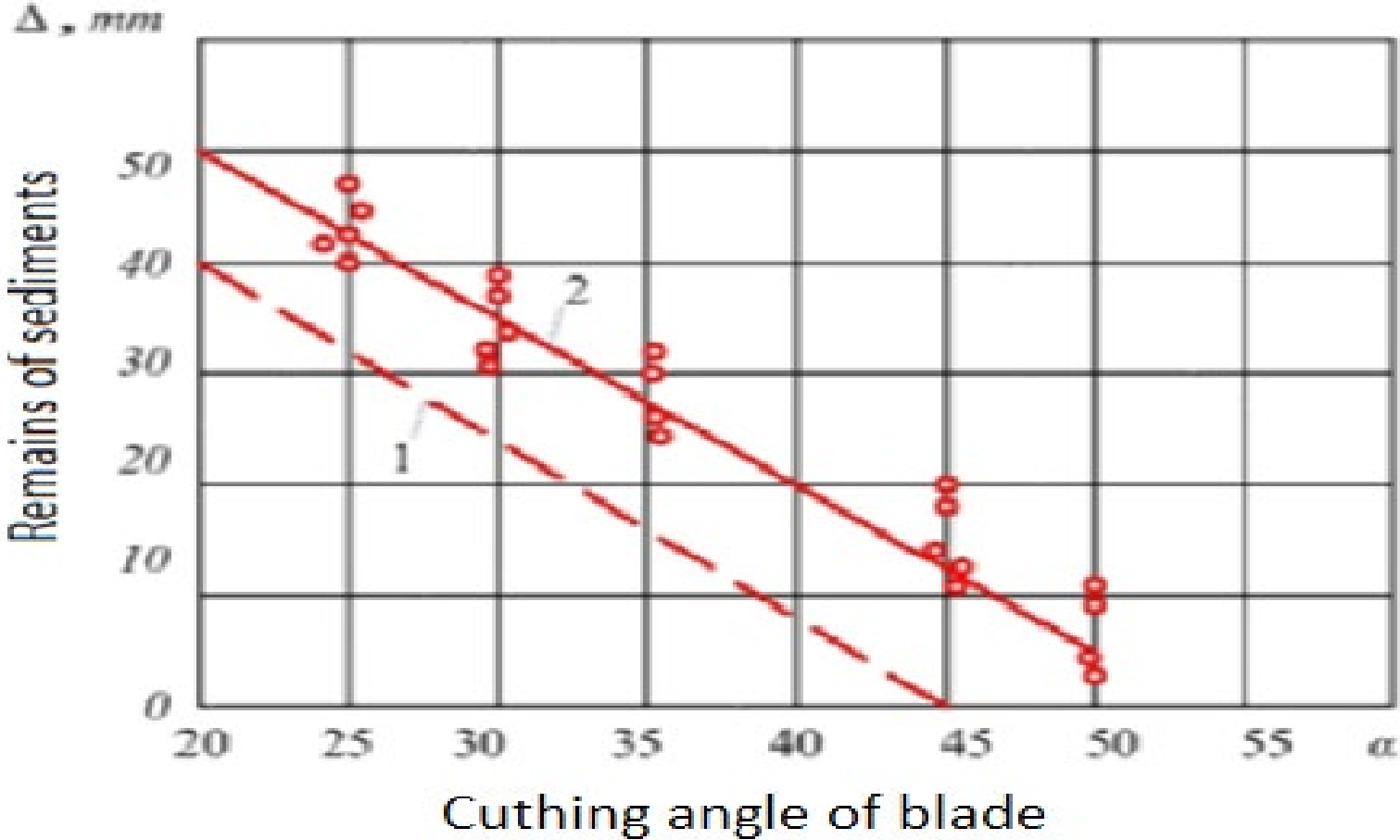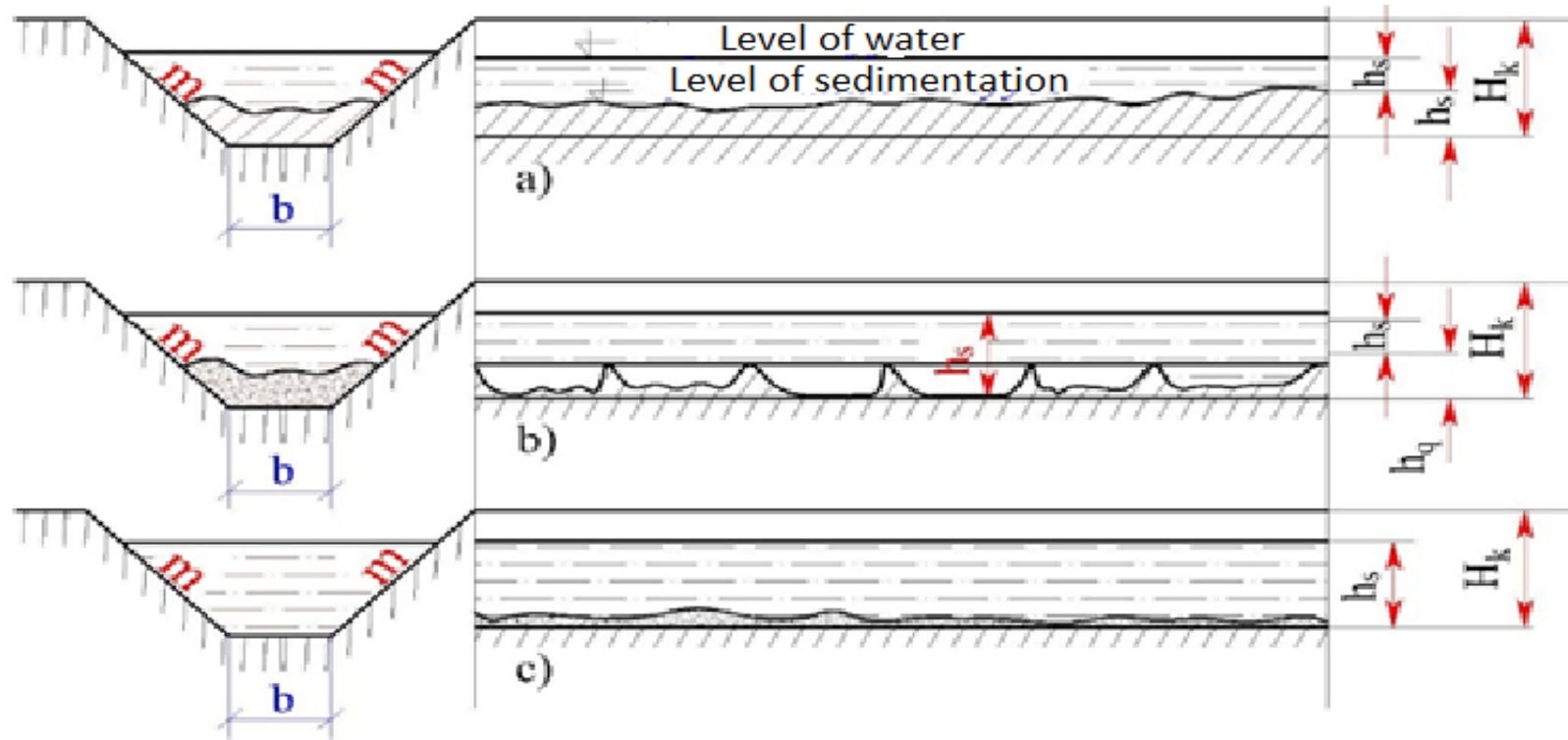**Fique 1. Graph of the dependence of the quality of channel cleaning (Δ, mm) on the cutting angle of the blade blade (α). q=0.27 – 0.32; 1 – theoretical; 2- actual indicators**
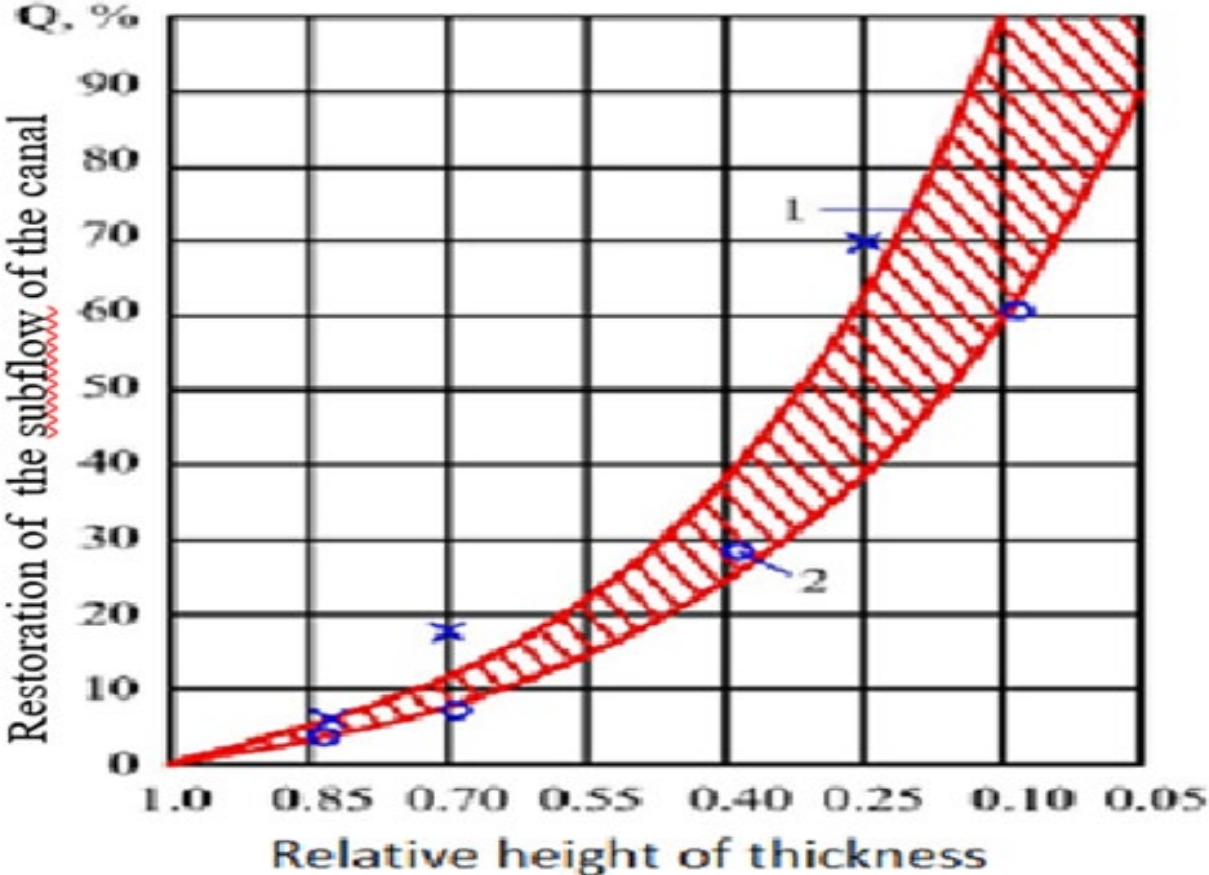
Fiqure 2. Transverse and longitudinal profiles of settled and cleaned channels; a – with a stagnant channel; c— when cleaning the canal with a narrow ladle; c – when cleaning the canal with a wide ladle

$$\Delta = b_n (1{,}0 - \sin \alpha_x) \sqrt{K_q \cdot K_u} \qquad (1)$$

$$W_q = \frac{1}{S} \cdot \frac{k^1 \cdot h_q}{2} \cdot k_q = 0{,}5 \cdot k_q \frac{k^1 \cdot h_q}{B_i - k^1 \cdot h_q} \qquad (2)$$

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Figure3 .Effect of residue height (hq) on flow rate during deep digging

1 – when k1 =2.0; 2 – when k2=3.0.

$$K_s = \frac{Q_f \cdot 100\%}{Q_t} \qquad (4)$$

$$Qf = (B1 - k1hq)\ bkhj.$$

$$K_n = \frac{W_f \cdot 100\%}{W_c} \qquad (5)$$

CONCLUSION

It should be noted that silt and sediment are distributed extremely unevenly along the length of the canals. For a conductive network, for example, maximum volumes are usually concentrated in areas close to the mouths of drains or open drains. In the process of cleaning channels, the quality of work and productivity of the machine, digging resistance, the degree of filling of the bucket and the duration of excavation work are influenced by the thickness of sediment, the presence of coating, the thickness of sediment and the cut layer and other factors characterizing the interaction of the working body with the environment.