Global Scientific Review
A Peer Reviewed, Open Access, International Journal
www.scienticreview.com
Volume 1, February 2022 ISSN (E): 2795-4951

Laboratory Research of Multiple Flow Movement in Pipelines

Makhkamov DA,
Master's student of Tashkent State Transport University.
Chorshanbiev UR,
doctoral student of Tashkent State Transport University
Babaev AR,
Associate Professor of Tashkent State Transport University, Phd

Annotation. In mining and processing enterprises, the properties of sludge flow mixtures are determined primarily by the particle size distribution and bulk concentration of solid particles. The constant interaction of liquid and solid particles requires the determination of the pressure drop and the flow rate. Existing methods of hydrotreating of turbid liquids are based on the laws of turbulent motion and the empirical and semi-empirical relationship between kinematic and dynamic flow parameters such as particle size distribution, concentration and critical velocity of solid particles.

Keywords. Dispersion system, flow, velocity, order of motion, pressure pipe, pump operating point, turbidity concentration.

Introduction. The purpose of the laboratory is to analyze the turbidity of the liquid in the pressure pipe with the help of pumps and to determine the effect of turbidity concentration on the flow rate and turbidity parameters of the pump. As a result of the study, the change in the characteristics of the pump pressure was checked due to the change in the mud concentration in its flow.

Development of energy-saving methods in the provision of hydraulic transport of loose flows in pipelines in the construction, mining and water industries in the world, taking into account the logic concentration, mechanical structure and grading of pipelines in the process of hydraulic transport. Scientific research is being carried out in the field of technology development.

At present, theoretical and practical results are being achieved in the country in the field of cleaning of water basins, hydraulic structures with the help of pressure pipes, raising the flow of mud in construction, control of the systematic movement of viscous systems in the chemical industry. The Action Strategy for the Further Development of the Republic of Uzbekistan states that "... the task is to increase labor efficiency in various sectors of the economy, expand new energy sources, increase energy-saving technologies in production, reduce resources and energy consumption in the economy." [1].

Volume 1, February 2022 ISSN (E): 2795-4951

In the conditions of modern market relations, one of the important directions of accelerating the mining industry, increasing its efficiency and competitiveness is a significant increase in the efficiency of transport systems, lowering the cost of transportation of raw materials and products of its processing. The development of such a base is associated with the introduction of continuous modes of transport, among which hydraulic transport plays an important role. The properties of turbid flow hydraulic mixtures in mining and processing enterprises are determined, first of all, by the particle size distribution of solid particles and their volumetric concentration.

The interaction of liquids and solids during the joint motion indicates the loss of specific gravity and the carrying capacity of the flow [2,3,4,5]. Existing methods of hydraulic transport of turbid liquids are based on the laws of turbulent motion, and empirical and semi-empirical connections between the kinematic and dynamic parameters of flow, such as particle size distribution, concentration and critical velocity of solid particles.

The basis of these methods is the academician M.A. Velikanov's model of gravitational flows of suspended suspended particles and Professor V.M. Makkaveev's diffusion model. The main purpose of these methods is to determine the minimum velocities corresponding to the carrying capacity of the turbulent flow under the influence of gravity and the values corresponding to the dimensions of the pipe [3].

In the study to assess the impact of the amount of mud in the pressure pipes and the component on the parameters of hydraulic transport, mud flow in the pressure pipes of separate production enterprises of JSC "Almalyk MMC".

Figure 1. Repeat the fuzzy flow at the object of study working process

Table 1
Information on pumps used in the concentrator of the Almalyk Mining and Metallurgical Combine

№	Насос маркаси	м³/соат	Напор, м	ФИК %	Ишчи ғилдирак диаметри	Қувват, кВт	Айланишлар сони, мин
1	8Гр8	400	38	65	500	125	986
2	5Гр8	150	35	55	325	40	1450
3	Грат 350/40	350	40	64	510	132	1000
4	Грат 700	700	40	67	535	250	965

Mud flows are transmitted in 219 mm, 273 mm and 325 mm pipes of three diameters. The purpose of the laboratory study was to analyze the hydraulic processes in the pressure-fed pipelines and to determine the effect of the concentration of sludge in the flow on the hydraulic parameters of the flow and the pump. As a result of the study, changes in the pump flow characteristics were studied in relation to changes in the mud concentration in the flow [4,5,6].

In the process of hydraulic transport, the main energy parameters of the flow depend on the selected pump parameters. The pump, together with the electric motor that drives it, is called a pump unit. Basic technical parameters of pumps:

Pump consumption Q (m3 / s) is the volume of mixture passing through the pump per unit time.

The pressure of the pump is determined by:

$$P = P_H - P_B + \rho \frac{\vartheta_H^2 - \vartheta_B^2}{2} + \rho g\left(Z_n - Z_B\right), \quad (1)$$

$$H = \frac{P_{ман}}{\gamma} + \frac{P_{вак}}{\gamma} + h_0 + \frac{\vartheta_H^2 - \vartheta_B^2}{2g} \quad (2)$$

Here: Rn and Rv are the pressure values at the outlet and outlet of the pipe;
Flow, flow - average speeds of water flow in the outlet and outlet of the pump;
Zn and Zv are the values of the height at the center of the outputs and outputs of the pump. The difference between the total pump energy at the pump outlet and the inlet pump is referred to as pump pressure N

$$N_n = \gamma QH \qquad (3)$$

$$\eta = \frac{N_{ж}}{N}, \qquad (4)$$

Indicators of R man and R vacuum manometer and vacuum gauge; the vertical distance between the hoses of the manometer and the vacuum gauge; VH and VB are the average velocities of water from the points where the pressures are measured.

The effective power of a pump is defined as the power consumption and pressure of the pump:

$$N_n = \gamma QH \qquad (5)$$

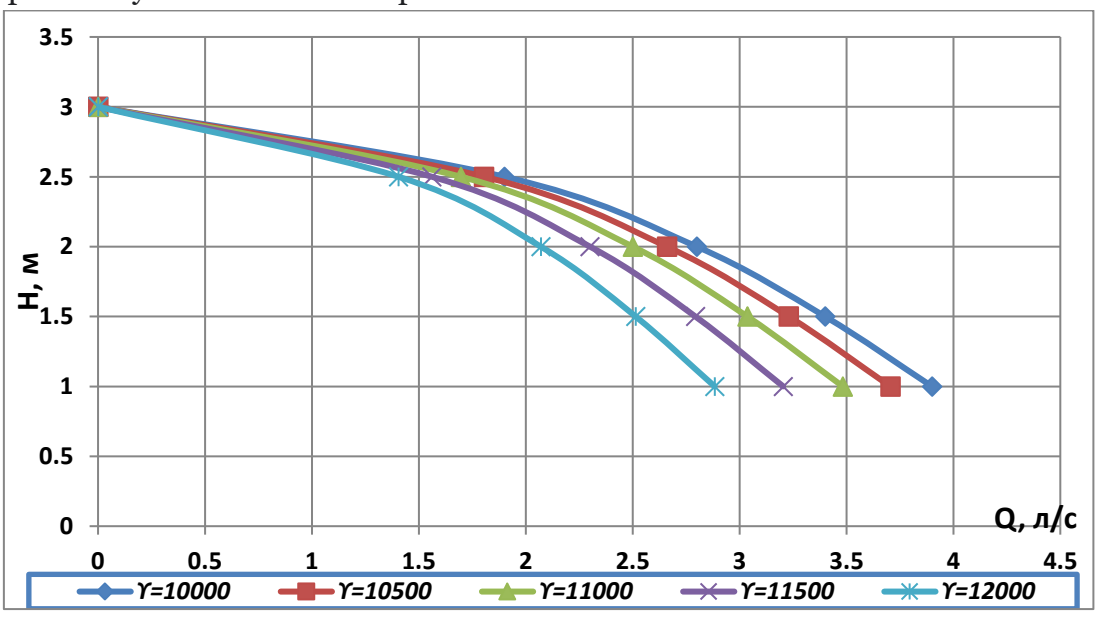
The efficiency of the pump is the ratio of the effective power to the pump power:

$$\eta = \frac{N_{ж}}{N} \qquad (6)$$

Based on the values obtained from the experiments, the pressure characteristic of the turbid flow H = f (Q) was formed. We can see from the graph of how the pump changes when the liquid and solid particles are transferred to the operating mode (Figure 2).

For the turbulent state of the mud flow, using the known possibilities of the theory of solid particle flow motion in the pressure pipes, the dependencies for the calculation of the hydraulic parameters of the mud hydraulics in the proposed pipeline systems were proposed [6,7].

In the course of the research, the expression for critical speed was evaluated comparatively on the basis of experience and data from other authors.



2-расм. Лойқали оқим сарфи билан напор орасидаги боғланиш

Volume 1, February 2022 ISSN (E): 2795-4951

The presence of solid particles in the flow reduces the turbulence of the flow: the incompatibility of the local velocities of the liquid and solid phases leads to the formation of resistance forces.

References

1. Uzbekistan Republican Presidential 2017 July 7 February PF4947-dream “Uzbekiston Republicsini yanada rivojlantirish buyicha harakatlar strategysi tugurisida” gi Farmoni.
2. Kraiko A.N., Sternin L.E. On the theory of two-velocity flowcontinuous medium with solid or liquid particles, Prikl. mathematics and mechanics. -1965.-29, issue 3-p.418-429.
3. Makkaveev V.M. On the theories of the flow of turbulent streams,containing suspended loads // Izv. AN SSR. Rel. -1952.-№2-s2626-279.
4. Babaev A.R., Zhonkobilov U.U., Samiev L., Isakov Kh.Unsteady pressure movement of the gas-liquid mixture in pressurepipelines of pumping stations // Fargona Polytechnic Institute ilmiy tekhnik journal 2018 Yil (Mahsus son) 2018, - P. 172-176
5. Babaev AR, Samiev LN, in the pressure pipes of the pumping station
6. Studies of the movement of muddy currents // Bulletin of the Tashkent Institute of Railway Engineers. - 2019 - №1, pp. 20-23.
7. Babaev AR, Rakhimov KT, Abduraimova DA, Cinematographic device Theoretical bases of determination of parameters // Bulletin of the Tashkent Institute of Railway Engineers. - 2019 - №4,, - 29-35.
8. Babaev AR, Definition of hydraulic parameters of hydraulic transportin pressure pipelines // Baku science, research, development # 18 (наука, исследования, развитие # 18) konferensiya 2019 yil, - C. 23-28