



ANALYSIS OF THE CYLINDER ROD MOTION STATE IN THE PROCESSES OF AIR BUBBLE FORMATION IN THE WORKING FLUID OF THE HYDRAULIC SYSTEM

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Annotation. *Effective operation of crankcase hydraulic excavators in a hydraulic system is significantly affected by temperature conditions. In the hydraulic system, a sharp increase in the temperature of the working fluid or of the parts on which the packing gaskets are applied leads to burning of the packing gaskets, resulting in a loss of their elasticity and an increase in their hardness. This reduces the service life of these seals, besides causing leakage of working fluid in the hydraulic system.*

Keywords. *hydraulic systems, technical and technological solutions with high performance, hydraulic excavators, RH-40E.*

Introduction

Usually, the working fluid flowing in the pipes of hydraulic machines generates the necessary pressure values in the hydraulic system based on various kinematic laws. At the expense of the occurrence of different types of flow as a result of such kinematic movements, when the flow movement of the working fluid flowing out of the pipe meets some kind of barrier, its own flow tends to flow around the barrier, changing the surface of the cross-section. . In such processes, a



vacuum is created in the fluid flow, and a state of cavitation is observed at the expense of a change in normal pressure in the mainly connected parts of the system.

Materials and methods

The artificial formation of air bubbles in the hydraulic system and the movement of an air bubble-free cylinder in the existing hydraulic system in the “scientific research laboratory” of Navoi State Mining and Technology University were experimented with in the Lucas Nulle experimental device named automation technological processes. To carry out experimental tests, a scheme of the Lucas Nulle experimental device was drawn up in the case presented in Figure 1.

1. Results and discussion

The experiment made it possible to observe the disproportionation of the movement of the cylinder stock at the input and output and load fluctuations at the stop limits, and a graphical analysis of the changes in the indicators of the established barometers and the time duration of the stroke at the inlet and inlet of the cylinder, the effect of air bubbles. The change dependence values of the monometer over time as the cylinder barrel moves upward are given by a graph in Figure 2 below.





FIGURE 1. Structure of the schema when conducting an experimental test in the Lucas Nulle experimental device; 1-barometer measuring pressure in the cylinder porcelain area, 2-barometer measuring pressure in the cylinder stock Area, 3 - mass, 4 - glass tube monitoring the air bubble in the liquid, 5-hydrosilindr

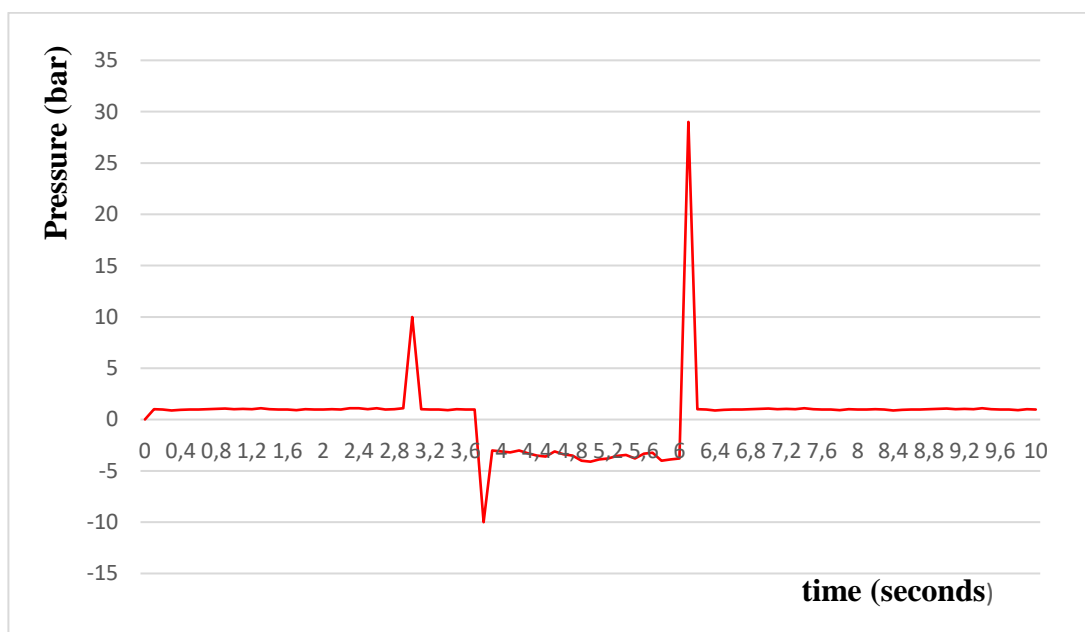


FIGURE 2. Change dependence of the monometer over time when the cylinder shaft is moving upward

References

1. Ismatov Adxamjon Alibek o'g'li, & Raxmatov Ramazonjon Ravshan o'g'li. (2024). Gidravlik tizimlardagi ichki nosozliklardan suyuqlik oqib chiqishini ishqalanish kuchlari asosida matematik modelini ishlab chiqish.
2. E. V. Alifanov, A. M. Chaikun, M. A. Venediktova, I. S. Naumov, Aviation materials and technologies, **2**. 51-55 (2015)
3. Yu. A, Mikhailin *Structural polymer composite materials 2nd edition, revised* (Scientific bases and technologies, Saint-Petersburg 2016)



4. B.R Toshov, A.D Nietbaev, AA Ismatov Educational Research in Universal Sciences 2 (3 SPECIAL), 473-476. M. G. Rakhutin, Giang Quoc Khanh, A. E. Krivenko, and Tran Van Hiep. Journal of Mining Institute. Vol. 261, 374-383. (2023).
5. D. Mukhitdinov, Y. Kadirov, S.Boybutayev, O. Boeva, and U. Babakhonova, Journal of Physics: Conference Series, 2024, 2697(1), 012041 (2024)
6. A.S. Zhuraev, S.A. Turdiyev, S.T. Jurayev, and S.S.Q. Salimova, Vibroengineering Procedia, **54**, 252–257 (2024)
7. K. Akbar, T. Javokhir, A. Lazizjon, K. Umidjon, and I. Muhammad, AIP Conference Proceedings, **3152(1)**, 040006 (2024)
8. Y. Kadirov, O. Boeva, A. Rasulov, and A. Abrorov, Journal of Physics: Conference Series, **2697(1)**, 012040 (2024)