DEVELOPMENT OF FILTER MATERIAL FOR FILTRATION OF WORKING FLUID IN HYDRAULIC SYSTEM.

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Annotation

Today, it is important to increase the efficiency of hydraulic excavators used in the mining and construction industries. To ensure the efficient operation of hydraulic excavators, it is necessary to ensure the reliable operation of the parts of the excavator. Among the factors that cause downtime is the cleanliness of the working fluid of excavators, which significantly affects the speed of operation. This article provides a detailed comparison and analysis of the results obtained by the porous filter of hydraulic excavators operating in the world, which allows effective filtration of the working fluid, and the cleaning of the working fluid in the hydraulic system from the porous filter. In order to ensure the cleanliness of the working fluid of hydraulic excavators used in the country, work has been done to localize the filters to see the economic benefits of achieving the above results.

Keywords: Hydraulic excavators, hydraulic system, porous filter, malfunctions.

At present, many large enterprises of the Republic use hydraulic devices. The advantages of hydraulic devices over other devices have been noted in the foreign literature. In a hydraulic system, energy is the source of the working fluid and its cleanliness is important. Much research has been done on the purification of working fluids in hydraulic systems, and scientists Filkinstein, Brotsky, and others have made significant contributions to the purification of working fluids. Based on the analysis of these studies, it is relevant to develop the most effective methods of filtering the working fluid.

In many sources, additional methods for cleaning methods and control of purity have been considered, the results of the analysis have been obtained, and in return the purity class of the working fluids has been achieved. B.N. In

Slesarov's work we can see that the results of the application of the oil unit during storage, transportation and pouring of the working fluid and a separate filter device PFU-10m in the tank of the hydraulic system as a separate system showed that the reliability of hydraulic drive increased by 25-30%. improved monitoring of the technical condition of the system during maintenance and proved that the rational operation of the working fluid, depending on the operating resource of the contaminated working fluids, reached 10-12 classes of purity. Oboyansev O.Yu. In their work, the following results were obtained in the working fluid purification hydraulic system. In the hydraulic system, the method of operative control of the specific purity of the working fluid was monitored by means of an analyzer FS-112, which automatically detects mechanical particles. During maintenance, the fine cleaning of the additional working fluid through the filter reduced the contamination of the working fluid by 3-5 times and achieved reliable operation by 2-3 times. So we can conclude that filtering the working fluid is one of the main tasks. The economic effect of achieving the above results to ensure the cleanliness of the working fluid of hydraulic excavators used in our country can be achieved through the localization of filters. In our study, the material that allowed effective filtration of the working fluid was a porous medium filter. According to the research of the porous filter, G.V. Golubev and G.G. It is widely mentioned in Tumashev's works. In our country, our goal and task is to use porous filters as a separate filtration system in the working fluid, made from local raw materials. One of the main tasks of our article is to analyze the microscopic structure of the porous filter and the results obtained in the cleaning of the working fluid in the hydraulic system from the porous filter.

Results

Any porous barrier can have up to 3 media in the filter.

Perforated pores are composed of microtubules in the form of wall cracks that vary in diameter. The result is the ability to trap solid particles.

Written pores are pores that have no effect on closed particles on all sides.

Closed bubbles are open on one side and inscribed on the other. As a result, debris accumulates in these pores.

Cleaning of the working fluid occurs only in the porous pores of the porous filter. This can be seen in the classification of barrier filter pores with a common coefficient.

$m_n = Vn / V$

the total porosity coefficient of the mn-filter barriers.

The total porosity of the Vn-porous filter.

V- filter volume.

In this case, if we expand V further, we get V = Vn + Vm.

Vm is the material volume of the filter.

In addition to mn, there are also calculations of external and internal porous coefficients, and only the method of filtering with external porous coefficients can be considered. This is because the filtration process does not occur at the internal porosity coefficient.

In this case, the coefficient of external porous barrier filtration is as follows.

m_1 = (Vt.g ^ '. + Vb.t.g ^'.) / V

In porous filters, the structure of the pores is chaotic, which does not allow it to form a mathematical model of the working fluid. It is therefore considered by determining the average velocity of the working fluid from the porous filter.

v_g '= (W / T) / ((V_ (t.g ^'.) + V_ (b.t.g ^ '.))) / (V_n + V_m) * S)

This is also called the Dunon Forxgemer hypothesis.

Discussion

Based on the above theoretical data, we can conclude that the large number of permeable pores improves the permeability and filtration of the working fluid.

The Borusa Bexolda method for determining the porosity of porous filters (bubble method) is given in the sources. In this process, the size of the pores is determined under pressure. In this case, the air begins to flow out of the pores under the influence of air pressure, saturating the required amount of liquid in the porous filter. The output of the initial bubbles is the maximum pressure under pressure. The appearance of bubbles on the entire surface of the filter is the average pressure.

These results are determined by the following formula.

dn = 4a / p

dn- hollow Demetri, m

a- coefficient of surface tension, N / m

Porosity is the ratio of the volume of porosity to the total volume of the body. In a broad sense, the concept of porosity includes information about the morphology of a porous body. Structural features (hole size, size distribution, hole size, specific surface area) are often referred to as “porous body structure”. Porous bodies are common in nature (minerals, plant organisms) and in

technology (adsorbents, catalysts, foams, building materials, filters, fillers, pigments, etc.).

The aim of the experiment was to develop optimal parameters for the purification of hydraulic working fluid through a porous filter.

In this experiment, we will consider the following tasks:

- Development of a new localized porous filter.
- Microscopic analysis of the size of the pores of the porous filter.
- Research of methods of filtration of hydraulic working fluid.
- Analysis of the parameters of the filtered working fluid from the porous filter.

The following tools and equipment were used in our experimental experiment. Electric energy meter, water heater, mixing bowl, spatula for mixing, microscopes, micrometer calibration line for measuring particle diameter, LED copying panel, analytical balance Mettler Toledo model: ms204TS

Conclusion

This means that the hydraulic excavator is not sufficiently equipped with layered and non-layered methods to clean the working fluid from the porous filter, which adversely affects the efficiency of the supply of spare parts. Therefore, cleaning of the hydraulic excavator working fluid from the porous filter requires consideration of measures to localize the supply.

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