

ANALYSIS OF THE NEGATIVE IMPACT OF THE COMPOSITION OF POLLUTANTS IN THE WORKING FLUID OF HYDRAULIC EQUIPMENT

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ABSTRACT

Recently, the main problem in the operation of hydraulic excavators is the contamination of hydraulic fluids with various minute dust impurities of rocks. As a result, there is a rapid wear of the parts of such machines. The article is devoted to the clarification of the composition of contaminated impurities. Microscopic analysis was used to study the clogging of hydraulic oil. The viscosity of the studied samples after their distillation decreased in comparison with the initial ones.

Keywords: *hydraulic fluids, IR spectra, viscosity, density, distillation, butanol, cyclohexane, microscopic analysis.*

АННОТАЦИЯ

В последнее время основной проблемой при эксплуатации гидравлических экскаваторов является загрязнение гидравлических жидкостей различными мельчайшими пылевидными примесями горных пород. В результате происходит быстрый износ деталей таких машин. Статья посвящена уточнению состава загрязненных примесей. Для изучения засорения гидравлического масла использовали микроскопический анализ. Вязкость исследуемых образцов после их перегонки уменьшилась по сравнению с исходными.

Ключевые слова: *гидравлические жидкости, ИК-спектры, вязкость, плотность, перегонка, бутанол, циклогексан, микроскопический анализ.*

Quantitatively, the fraction of inorganic particles (practically adequate to the so-called "ash content") in the total mass of contaminants is usually about 50%,

increasing as the purity of the liquid [4, 5]. The qualitative composition of inorganic impurities is illustrated in Fig. 1, data obtained by analyzing 172 g of sludge extracted from working fluids hydraulic systems of construction and quarry excavators. It should be borne in mind that the specifics of operating conditions significantly affect the physicochemical composition of contaminants.

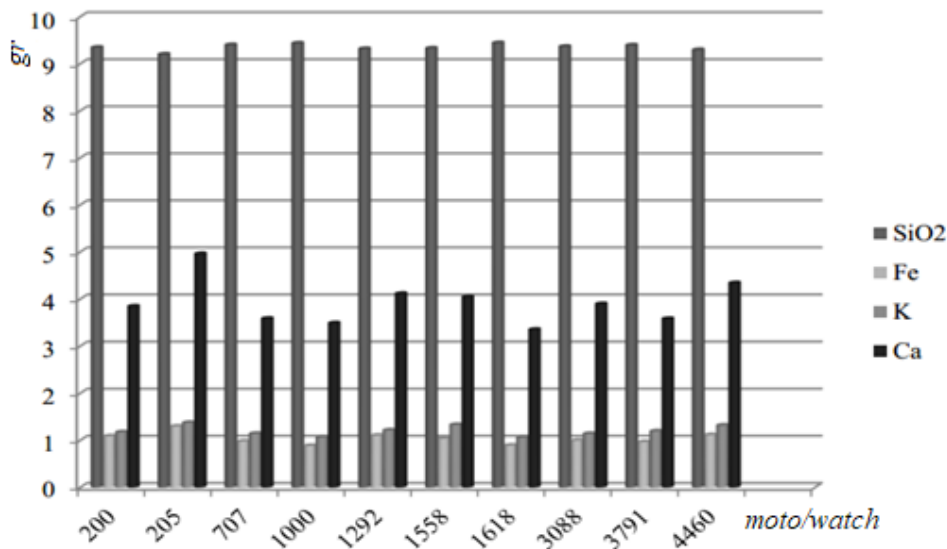


Figure 1. Composition of pollutants

Translation results in the 3,088 hours of hydraulic oil Tellus-68 hydraulic oil under a microscope microscope, solid particles in the form of corrosion products can be seen, metal particles in contact with oil, wear products, water (in the form of round transparent halos), silica dust, and rarely occurring pieces of rubber.

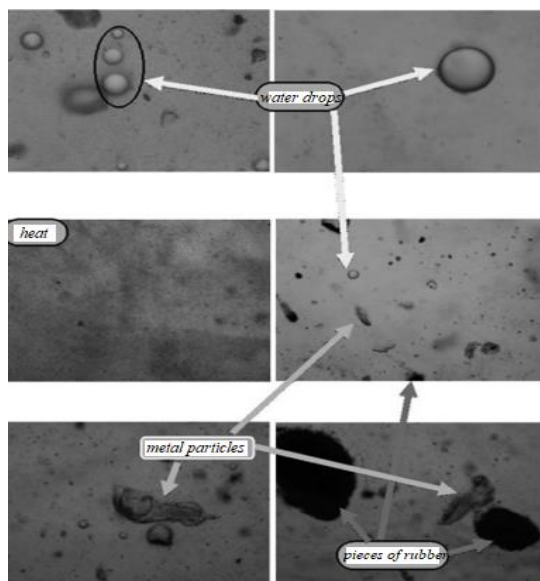


Figure 2. Microscopic analysis of Tellus-68 hydraulic oil clogging, after 3,560 engine hours

Translation results In images V, D, G, and E), the dust is seen as tiny particles and metal chips are seen as light brown particles with irregular edges of particles. In photos A and B a piece of piece of rubber with the presence of small metal chips. The oil was used for 3,088 engine hours at Vostochny mine in the hydraulic system RH-40E excavator. Microscopic analysis fouling of hydraulic oil Tellus-68, that worked 3,560 moto-hours is shown in Fig. 2. [1, 2,3,6,7,8]

It has been established that the specifics of operating conditions of

hydroficated mining machines significantly the specific operating conditions of hydroficated mining machines significantly affect the physico-chemical composition of contaminants of hydraulic fluids. Proposed various methods of analyzing the working fluid of a hydraulic volumetric power unit for hydroficated mining machines are acceptable, and they fully and completely correspond to the modern requirements. It is established that abrasive particles in hydraulic oil lead to early wear of pumps' rubbing components with their subsequent destruction. This results in clogging of the hydraulic system and is one of the main reasons of the failure of pumps and hydraulic system components. This is one of the main causes of failure of pumps and hydraulic system elements.

The main function of the working fluid in the hydraulic system will be made up of situations caused by the transportation of pressure energy, the storage of details from the carriage, the nature of lubrication between the details, the increase in the temperature released by friction, the change of The Shape of the compactors in the slits between the details.

Hydraulic system failures many sources have researched the results of adverse effects on useful performance factor, efficient performance, and the overall system itself as a result of a study of the buoyancy of working fluids to purity quality and viscosity.

Impurities can be in a solid, liquid and gaseous state.

The fact that the amount of water in the liquid state pollution content is suspended in the liquid in the case of small drops in the Jude disrupts the lubrication layer of hydraulic details and causes the details to rust.

Solid particles cause the pair to be eaten as a result of friction between the details and, as a result of being harmed under pressure, cause the details to end and break in the slit.

As the air mixed into the working fluid suddenly heats up, forming a diesel-effect, that is, the air bubble rises and explodes at a temperature of 300-350 C⁰, micro-alloys that are released in the wear of the working fluid and the burning of additives cause negative effects. It is the solid particles that are most exposed in the hydraulic system, causing a malfunction in the amount of 50-80%. Reduces the resources of seaplanes up to 3-50 times.

Pollution from solid particles in the working fluid has become micro-alloys under the physical and chemical action of additives contained in the working fluid under the influence of water and air intercalated from the external environment or not. The working fluid is classified as follows for partial contamination to begin from production:

- productive pollution-pollution from the structure or external condition;
- operational pollution-the occurrence of external or structural contamination in storage and transportation;
- exploitation pollution-pollution caused by the use of hydraulic excavator in hydraulic system;
- technological pollution-in a technological ravine (pressure, temperature, etc.k) comical reaction with air results in;
- atmospheric pollution-pollution by dust in the air (silicon, calcium, aluminum, iron);
- contact contamination is the condition under the influence of pollution in all processes as well as with details

The occurrence of a working fluid with a mechanical air mixture, a change in the nature of the compactors is observed when the atmospheric pressure of the hydraulic system adds up the amount of air at the moment of the formation of the process of re-surfing in working fluids at low points. As a result, a mechanical air aralshma is formed in the system, and a pressure pump with an impact of 200 kg/cm² useful work factor Reduced by 10%.

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