Volume 3, Issue 1, January - 2025 **ISSN(E):** 2938-3773

THE INFLUENCE OF SHARPLY -CONCENTINAL CONDITIONS ON AGING HYDRAULIC OILS OF AGRICULTURAL AND RECLAMATION TECHNOLOGY

A. Sobirjonov
Associate Professor

I. I. Usmanov
Assistant Ташкентский государственныйтранспортный университет

Abstract
Extremely continental climatic conditions, characterized by significant daily and seasonal temperature changes, low air humidity and intense solar radiation, have a significant impact on the performance characteristics of hydraulic oils used in agricultural and reclamation equipment. Under these conditions, the processes of oxidation, thermal degradation and contamination of the oil are accelerated, which leads to a decrease in its lubricating, anti-corrosion and viscosity properties. The article examines the main factors of aging of hydraulic oils in extreme continental climatic conditions, analyzes the mechanisms of degradation, and also offers recommendations for the selection, operation and replacement of oils to increase the reliability and durability of equipment.

Keywords: Sharply -contact climate, hydraulic oils, aging oils, agricultural equipment, reclamation technology, oxidation, thermal degradation, operational properties, reliability of technology.

Introduction

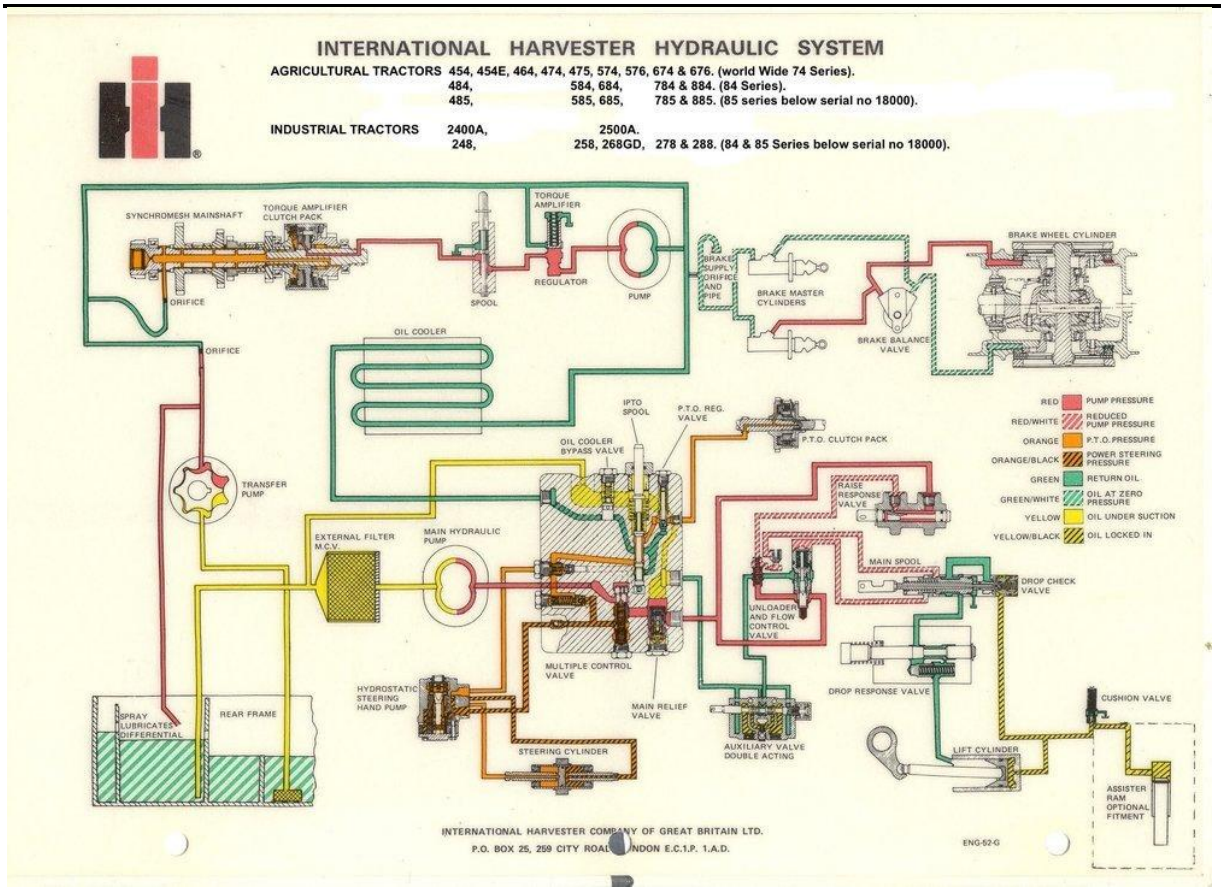
Small -contact climatic conditions characteristic of a number of regions are significant challenges for the operation of agricultural and reclamation equipment. These conditions include extreme temperature changes, low humidity, high solar radiation and significant wind loads. All these factors have a negative effect on working fluids, including hydraulic oils that play a key role in ensuring reliable and efficient operation of hydraulic systems.

The aging of hydraulic oils, which occurs under the influence of adverse climatic and operational conditions, leads to the loss of their functional properties, such as viscosity, thermal stability, resistance to oxidation and antifriction characteristics. This, in turn, increases the risk of equipment failures, increases the costs of repair and maintenance, and also reduces the overall efficiency of production processes.

The purpose of this work is to analyze the influence of extreme continental climatic conditions on the aging processes of hydraulic oils, to identify the main factors of degradation and to develop recommendations for reducing their negative impact on the performance characteristics of oils.

Web of Discoveries: Journal of Analysis and Inventions
webofjournals.com/index.php/3

Web of Discoveries: Journal of Analysis and Inventions
webofjournals.com/index.php/3



The study considers the main physicochemical processes that affect the aging of hydraulic oils, including oxidation, thermal degradation, the accumulation of mechanical impurities and moisture. Particular attention is paid to the analysis of the influence of extreme temperatures, which can cause thermal instability and accelerated evaporation of light fractions of oils, which leads to a change in their viscous and temperature characteristics.

In addition, the influence of high temperatures and low nights on the formation of deposits in the system, as well as oxidation processes, which accelerate at elevated temperature and the presence of oxygen, is studied. The effect of low air humidity and increased dust load, characteristic of the steppe and desert regions, to pollution of the oil by mechanical particles, is also considered, which increases the wear of the components of the hydraulic system.

The work includes an analysis of existing approaches to the selection of hydraulic oils for operation in extreme continental climates. The features of using oils with improved antioxidants are considered

The influence of sharply -concentinal conditions on hydraulic oils. Hydraulic oils are a key element in ensuring the efficient operation of agricultural and reclamation hydraulic systems. However, the operation of technology in sharply contact climate conditions is accompanied by the influence of adverse factors, such as:

Temperature drops. Daily and seasonal temperature fluctuations can reach tens of degrees. At low temperatures, the viscosity of the oil increases, which complicates the launch of the hydraulic system and increases the wear of the components. At high temperatures, the oil loses stability, which leads to a decrease in lubricating properties and the formation of deposits.

Solar radiation. Intensive ultraviolet radiation contributes to accelerated oxidation of oil, which causes the formation of acids and precipitation, as well as a change in color.

Dust and pollution. In regions with low humidity and high dust loading, oil are subjected to pollution with finely dispersed particles. This leads to an increase in abrasive wear of the hydraulic system parts.

Water and condensate. Sudden temperature changes contribute to the formation of condensate inside the hydraulic system, which can lead to emulsification of oil and loss of its working characteristics.

1. Mechanisms of aging hydraulic oils
2. The aging processes of hydraulic oils include:

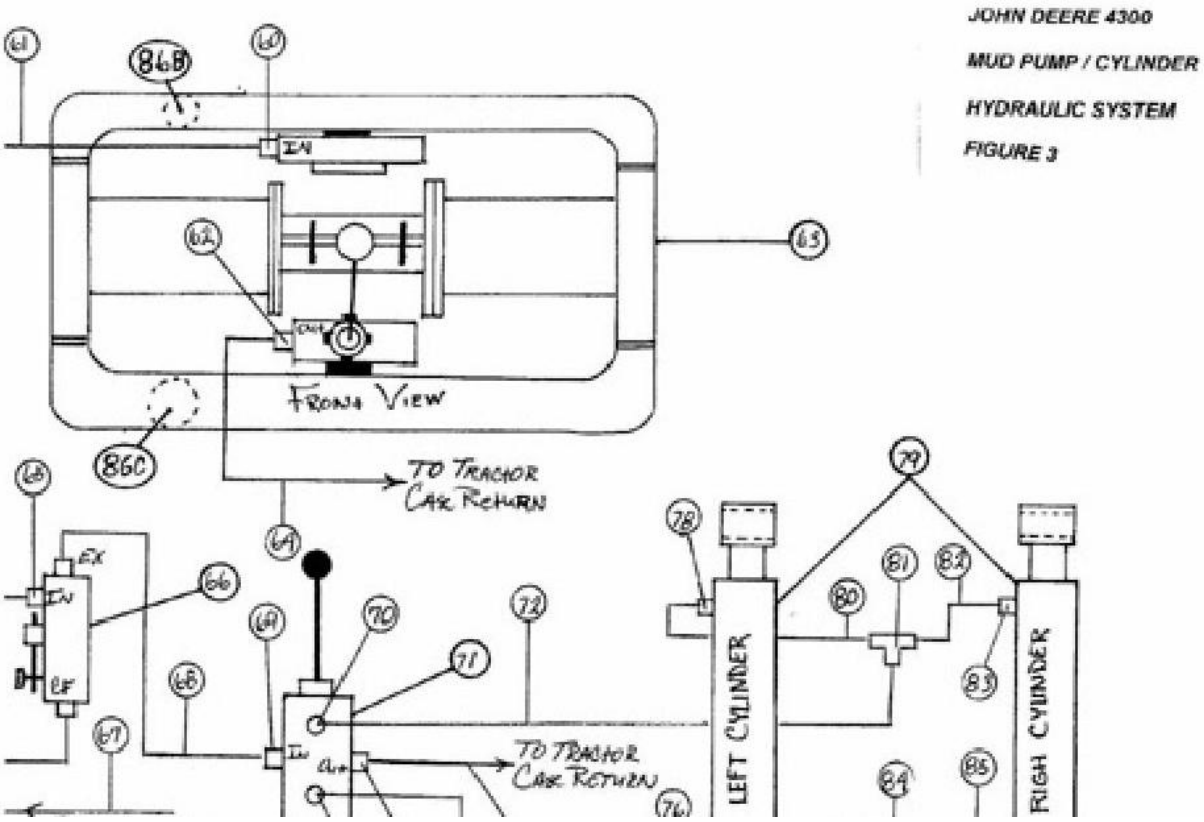
Oxidation. In contact with air oxygen and under the influence of high temperatures, oxygen - containing compounds are formed, leading to an increase in the acid number of oil and its corrosion activity.

Thermal degradation. At high temperatures, hydrocarbon chains are destroyed, which leads to a decrease in viscosity and the formation of varnish precipitation.

Contamination. Oil contamination by solid particles and water accelerates equipment wear and degrades oil quality.

Recommendations for reducing the impact of climatic factors. To increase the stability of hydraulic oils in extreme continental climates, it is necessary:

Use oils with improved characteristics. The use of oils with high thermo -oxidative stability, low staging temperature and resistance to emulsification.



Timely monitor the condition of the oil. Regular analysis of the oil for the content of water, mechanical impurities, acid number and viscosity allows you to timely identify signs of degradation.

Protect the system from dust and moisture. The use of sealed systems and effective filters minimizes the penetration of contaminants.

Follow the regulation of oil replacement. A clear adherence to the recommendations of the manufacturer to replace the oil avoids its critical aging.

Practical significance. The implementation of the proposed recommendations will extend the service life of hydraulic systems of agricultural and reclamation equipment, reduce operating costs and increase the efficiency of equipment in the conditions of a sharply -concentral climate.

Conclusion

Small -contact climatic conditions have a significant effect on the operational properties of hydraulic oils used in agricultural and reclamation technology. Extreme temperature differences, high solar radiation, dust load and condensation accelerate the processes of oxidation, thermal degradation and pollution of oils. This leads to a decrease in their functionality, increased wear of equipment and an increase in the cost of maintenance of equipment.

To minimize the negative impact of climatic factors, an integrated approach is required, including the selection of hydraulic oils with improved characteristics, regular monitoring of their condition, protection of hydraulic systems from contamination and compliance with maintenance regulations.

The application of the proposed measures makes it possible to increase the reliability and durability of hydraulic systems, optimize operating costs and ensure efficient operation of equipment in extreme continental climate conditions. The results of this study can be used to develop recommendations for the operation and maintenance of equipment in extreme climatic zones.

References

1. Авдеев М. В., Воловик Е.Л., Ульман И. Е. Технология ремонта машин иоборудования. — М.: Агропромиздат, 1986.
2. Белецкий Б. Ф. Технология и механизация строительного производ-ства. — Ростов н/Д.: Феникс, 2003.
3. Технический сервис машин сельскохозяйственного назначения: У чеб-ник для вузов / В. В. Варнаков, В. В. Стрельников, В. Н. Попов. — М.: К о -лос, 2001.
4. Васильев А.А. Дорожные машины. — М.: Машиностроение, 1987.