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State of the Issue of Dehydration of Motor Tractor Oils

Tursunov Sh. S.
Karshi Engineering and Economic Institute (Uzbekistan)

Abstract:
The oil becomes waterlogged even during transportation. Motor oil used in agricultural machinery should be free of water, and research results show that this figure reaches 0.07%.

Keywords: Transportation, water, results, container.

Introduction

Contamination of oils can occur at all stages of production, transportation, storage and use, and under unfavorable conditions it can reach large values.

In the work of Professor Udler E.I. the contamination of lubricants, in particular motor oils and hydraulic fluids of tractors used in agricultural production. He found that when transporting oils, due to moisture condensation in the container, the mass content of water reaches up to 0.04%; during storage its mass content increases further and reaches up to 0.08%. In this case, the water content in the oil will depend on the duration of storage and the volume of filling the container.

If the container is completely filled with oil, the water content can be almost three times less compared to a container half filled.

The work of Nikitin G.A. is devoted to the study of the influence of moisture accumulation in containers during storage. , Zhuldybina E.N., Shuvaeva V.Ya. etc. They established the reasons and degree of increase in moisture content when containers are unfilled. In order to reduce the water content of oils, it is recommended to fill containers to the upper level whenever possible.

A study of the water content of commercial oils from production to their receipt by consumers shows that when entering inter-district oil depots, the water content in oil is already 0.02-0.04%, i.e. The oil becomes waterlogged even during transportation. Motor oil used in agricultural machinery should be free of water, and research results show that this figure reaches 0.07%. In the works of Iskandarov U.T., Musurmanov R.K. the issues of purifying motor oil from mechanical impurities, fuel fractions and organic pollution. They substantiate the basic parameters of technical means for purifying oils. However, the issue of purifying motor oils from water remained in these works.

Current standards do not allow the use of oil with a water content of more than 0.025%.

Therefore, before refueling, watered oil must be subjected to preliminary, and during operation, periodic dehydration by settling, separation or filtration.

In the work of K.A. Sharipova and O.V. Lebedev comprehensively studied the effect of water content in oil on the wettability of the friction surface and they found that microdroplets

The water present in a drop of watered oil easily mixes the oil film with the hydrophilic surface (metal), which results in their adhesion to the surface.

This was confirmed during the experiment. A drop of oil with a certain amount of water was applied to the surface of a cast iron sample, which corresponded to the friction surface of the cylinder liner and through certain

The sizes of the spreading spots were measured at intervals using a microscope.

Studies of the influence of the wettability of oil with different water content on the setting load of run-in samples showed that the set of pairs run-in in oil with a water content of 4% occurred at a load of 1.72 kN, and pairs run-in in oil with a water content of 0.02% - at a load of 3.08 kN.

From the above it follows that the presence of water in oil destroys the oil film and surface structure of parts, impairs wettability and leads to seizure of tribo-joints.

A study of the contamination of transmission oils shows that the water content in it after 250...300 engine-hours of operation exceeds the permissible norm, therefore it is recommended to dehydrate the transmission at least 3 times during operation.

Working fluids used in the hydraulic system of tractors become intensively watered during operation; their content can reach up to 1.2%, which leads to intensive wear of spools and distributor valves.

There are two ways to ensure the purity of oils: preventing moisture from entering them and purifying watered oils. Maximum efficiency is achieved with the combined use of these methods, since preventive work to eliminate moisture from entering the oil significantly facilitates their subsequent cleaning.

Conclusion

The main measures to reduce oil contamination include preventing contact with dusty and humidified air, reducing the corrosive effect on the internal surfaces of tanks and other equipment, removing residual contaminants from them before filling and pumping, storing under conditions that ensure the stability of their quality (optimal temperature, reducing contact with atmospheric oxygen, etc.) The ingress of droplets of moisture can be prevented either by reducing the contact of oil with air, which is achieved by completely or partially sealing the tanks, or by purifying the air. Reducing the amount of air entering the tanks leads to a significant reduction in oil contamination not only by moisture, but also by atmospheric dust.

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