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OPTIMIZATION OF THE PROCESS OF WORKING-IN DETAILS OF GEAR PUMPS CONNECTIONS AFTER REPAIR

Viunyk O. V., sin. teacher,
Plakhotnyk I., student 11 sGM
Dmytro Motornyi Tavria state agrotechnological university, Zaporizhzhia, Ukraine.

Working-in of friction pairs is a mandatory technological process, which is of great importance for wear-resistant surfaces and, as a result, extending the service life of hydraulic transmissions. It is a complex process that takes place under the influence of a large number of different factors. The entire working-in process can be divided into three periods:

- the first is characterized by increased initial wear (during this period, the quality of the surface of the friction pairs is optimized);
- the second is characterized by a decrease in the amount of wear, a decrease in mechanical losses due to friction, strengthening of surfaces, geometric alignment of parts relative to each other;
- the third is characterized by the stabilization of all the main indicators of axial-piston units: wear of parts, feed rate, mechanical losses, oil pressure, temperature, etc.

A promising direction for optimizing the process of working-in parts is operational measures that ensure high wear intensity, the formation of the optimal microgeometry of the surface of the parts during working-in at idle with the subsequent maximum reduction of wear intensity during working-in under load.

According to their physico-chemical action, additives for increasing friction pairs can be divided into a number of groups: inactive substances; surfactants; chemically active substances; compositions that promote selective transfer [1].

Additives with the use of surface-active substances contribute to the intensification of the process of working-in the surfaces of the coupling parts due to the effect of adsorption reducing the strength of materials. Oleic, stearic and ricinoleic acids, ethers of organic acids, glycerin and others are often used as surfactants.

The use of organofluorine surface-active substances in various solvents and with various regulatory additives, which are called epilam, and the process of applying them to the surface - epilamization, is of interest. Epilam modifies the treated surface without changing its structure, giving the surface anti-friction, anti-adhesive, hydrophobic, protective and other useful

properties. The formed barrier film withstands temperatures up to T=400º C, does not break under shock loads of up to 300 kg/mm2 [2].

The general disadvantage of working-in parts on oils with inactive additives - the nature of the surface under the additive layer remains unchanged, and when using pure oil in the future, surface micro-uniformities are revealed and polished. In addition, these additives are insoluble in oils and precipitate during storage and filtration [2].

Tribopolymerizing additives are used during cold working-in of engines. Thanks to them, the adhesive interaction of the friction surfaces increases. The peculiarity of these additives is high lapping efficiency at a relatively low oil temperature [3].

Chemically active additives intensify chemical processes on the working surfaces of parts, which leads to the formation of layers of products of chemical interaction with metal, which separate the contacting surfaces, thereby preventing seizure and burrs [3]. Such additives, despite their effectiveness, have disadvantages: toxicity; chemical activity of additives with increasing load and temperature, which leads to increased corrosion and mechanical wear of parts; difficulties of preparation in conditions of repair production. An additive containing molybdenum disulfide forms thin, strong films on friction surfaces that reduce wear under heavy loads.

The conducted analysis shows that the service life of gear pumps of hydraulic systems and their inter-repair resource depends on the quality of the working-in of their parts during the post-repair break-in period.

The analysis of the used additives revealed that the most promising is the use of complex additives that contain surface-active and chemically active substances.

References

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