

Selection of Semi-Liquid Surkov Oil Composition, Depressor and Antioxidation Treatments for Oils Using Local Raw Materials

Shavqiyev Elbek ¹

¹ Jizzakh Polytechnic Institute, Student of the Faculty of Transport

Abstract:

This scientific article presents the results of many scientific researches about the composition of semi-liquid and reducing lubricants obtained on the basis of local raw materials in our country, as well as the selection of depressor and antioxidation agents for oils. Also, the quality indicators of the secondary raw materials of the Fergana oil refinery, the composition and structure of salomas and gossypol tar, the main groups of lubricating oils, the production of tar, the production of secondary oil residues, selectively refined and thermally processed products, aimed at obtaining a finished product with a new composition is also given.

Keywords: oil, temperature, residue, secondary raw material, thermal product, Fergana oil refinery, tar, mechanical mixture, oxidation, research object, exploitation.

Oil and gas in our republic since independence special attention is paid to industrial development and fuel supply independence was achieved.

Oil and gas lie in layers of the earth's crust at different depths, between various pores and other rocks together with hydrocarbons at a depth of 1-2 kilometers. The mechanism of formation of oil from organic residues is based on the loss of oxygen and nitrogen and the accumulation of carbon and hydrogen.

At the Fergana oil refinery located in the Fergana region of the Republic of Uzbekistan, the use of residual secondary raw materials and their quality indicators were checked. In doing so, he aimed to obtain a finished product with a new composition on the basis of selectively refined and thermally treated products of secondary oil residues. For example, the extraction of deparaffinized oil is a

complex process, and the oil distillate is extracted using selectors and selective refining. Refined oils are deparaffinized to increase the viscosity index and desulfurized in hydrotreating equipment. In this way, oils, which are considered the basis for all lubricants, are obtained.

Table 1 Chemical composition and physicochemical parameters of tar and deparaffinized oil

Naming of indicators	Deparaffinized residual oil	Tar
Kinematic viscosity, at 100°C, at 50 °C, sSt	21,4	*
Conditional viscosity, at 80 °C, sec	*	13,2
Sulfur content, %	0,8	3,16
Density at 20 °C, g/cm ³	0,901	0,973
Rolling temperature, °C	-15	*
Ignition temperature, °C	210	220
1. Paraffin-naphthenic, %	32,4	30,5
2. Aromatic hydrocarbons, %	65,8	50,2
3. Resins, %	1,7	12
4. Asphaltenes, %	*	7,2

Taking into account the following, scientific research and experimental tests were carried out at the Fergana Oil Refinery, and the composition and quality indicators, physico-chemical properties of local raw materials were studied.

Taking into account the above-mentioned issues, one of the most important areas of development of the oil refining and petrochemical industry, the processing of secondary components based on new technologies on the basis of local raw materials, the need to prepare competitive products for the domestic and foreign markets in accordance with the requirements of the times has arisen. Lubricating oils are used in various sectors of industry and national economy, and they are imported from foreign countries for foreign exchange. It is not economically efficient to import several types of lubricants that we currently use as imported products.

The main function of the gear oil in the vehicle is to reduce the deflection of the working surfaces of the gear wheels and the friction losses in the aggregates. In addition, the transmission oil of this reducer must remove the heat from the friction parts, protect them from corrosion, and maintain their long-term operability during the use of the vehicle. Also, it should reduce the impact of shock loads, the noise of gear wheels and their vibration, and tighten cracks in various joints. Gear oil is a semi-liquid oil, a very viscous black liquid with a density of 900-950 g/cm³.

Foreign literature and invention (patents) were researched to create the technology of production of reducer lubricants. The physico-chemical parameters of the residues of oil refining products were determined in the production of reducer lubricating oils: the processes of refining petroleum oils with phenol extract, the composition of processed oils and the residues of the oil industry were analyzed.

As we know, Nigrol (SAE 140) brand oils are currently being used instead of reducer lubricants. When creating this technology, we studied the adaptation of reducer lubricants to operating conditions and their requirements:

- Lubrication property (reducer gear oil collects and adsorbs on metal surfaces and forms a boundary layer, i.e., an oil curtain, an increase in pressure on the oil layer, or lubrication with a liquid).
- anti-oxidation property (Another main reason for the requirements for gear oil is its ability to

resist oxidation, the formation of various 76 mechanical compounds, the prevention of metal corrosion, and the ability to withstand temperature effects).

- Anti-warp property (Resistance to sticking of rubbing surfaces with temperature increase).
- Anti-scratch property (the product formed by using anti-scratch compounds in the oil and their decomposition affects the metal at high friction temperatures and reduces scratching processes).
- Anti-solidification property (in the case of oils, these conditions are mainly due to the fact that when the air is low, the oils lose their fluidity and prevent the growth of paraffin crystals in the oil).

In researching the quality of reducer lubricating oil, work was carried out based on the following components and State Standards selected in accordance with regulatory and technical documents as a research object.

It is a solid fat obtained by hydrogenation of healthy vegetable oils. Hydrogenated fat products (salamas) consist of saturated solid triglycerides and unsaturated fatty acids.

According to the quality indicators of gossypol tar, it must comply with the requirements of TSh 86-38-2001 technical conditions.

Semi-liquid lubricating oils protect the rubbing surface from the effects of various aggressive liquids, gases, vapors and various abrasive materials (dust, mud, etc.). Almost all lubricants serve to protect the surface of parts from corrosion. When creating gear reducer oils and adding 77 different components to their composition, the following are decisive from the operating characteristics of reducer gear oils:

- resistance to scratching, erosion and oxidation and high rheological properties (temperature dependence of viscosity) are required;
- applied lubricants should protect the surface of parts from erosion and wear;
- must carry frictional energy from the surface;
- Must reduce noise and vibration in gears and withstand impact forces.

According to the composition, lubricating oils are divided into four main groups, which are as follows:

1. Soapy lubricating oils - salts of high fatty acids are used as thickeners.
2. Inorganic thickening lubricating oils - inorganic thickening substances added to these lubricating oils should have a highly dispersed, thermally stable and strong surface area. These include silica gel (Si), bentonite (Vn), graphite (S) and others. Graphite provides both thickening and lubricating properties to lubricating oils.
3. Organic thickening lubricating oils - hard, temperature-resistant, highly dispersed organic substances with a high relative surface area are used as thickeners. This group of coating oils includes pigmented, polymeric, polyurea, organic coating oils.
4. Hydrocarbon lubricating oils - include hydrocarbons that liquefy at high temperatures as a blackening agent. This group of lubricating oils includes natural and artificial wax, paraffin, petralatum, ceresine lubricating oils.

In addition to the above classification, lubricating oils are also classified according to the type of dispersion phase and dispersion medium. According to the field of use, plastic lubricants are divided into three main classes:

- lubricants that reduce friction and wear;
- conservation lubricants - i.e. lubricants that reduce the wear and tear of machine and mechanism parts due to corrosion;
- Sealing lubricants - i.e. lubricants that seal non-sealing slots and non-tight parts of mechanism parts.

One of the most important additives is the anti-oxidation additives. Organic substances containing nitrogen and phenolhydroxyl groups are most often used as antioxidants of lubricating oils. The practical use of antioxidants shows that if the molecule has 2 functional groups, its effectiveness is higher than the effectiveness of the antioxidant with one functional group in the molecule. The use of a composition of antioxidants, that is, the combined use of alkylphenols and amines, is also highly effective. In such cases, the phenomenon of synergism is observed.

The main mass of reducer lubricants is made on the basis of distillate oils or their compositions. In order to improve the properties of gear oil, various additives from 0.001 to 5.00 are added to their composition: anti-oxidation, erosion, corrosion and scratching, and other additives that improve their movement, viscosity and protective abilities. In this section, the results on the syntheses of compounds that increase the depressant and anti-oxidation properties of thickened lubricating oils are presented.

Depressor compounds are synthesized in order to improve the rheological parameters of lubricating oils on the basis of petroleum oils obtained from domestic oils.

A depressant was synthesized on the basis of by-products of tar production of the oil refining industry. It is in the form of a dark tarry mass of black color, the main part of which is oil (residue of high molecular hydrocarbons in the part that is not driven during oil drilling), acids, tars, asphaltenes, carbenes, naphthenic and asphaltene acids and their anhydrides. Other compounds were synthesized on the basis of organic substances. From these, a polymer composite in the form of vinyl acetate copolymer with dodecyl ether of methacrylic acid is obtained.

In the preparation of compositions in plastering oils, the very effective use of additives and fillers together in optimal proportions depends on solving the following tasks;

- smoother regulation of the structure of lubricants;
- increase the efficiency of movement of each component and, at the same time, improve the operating characteristics of lubricating oils;
- Consists in reducing or completely eliminating the additional negative action of landings and fillers.

Additives added to reductor lubricants, especially those that improve the movement, lubrication and protection properties of bearings, or have positive functions such as oxidation stability, can also have a negative effect on the structure and operational properties of lubricants.

The most dangerous degradation process of reducer lubricants is due to the inclusion of surfactants, which, like other colloidal systems, are sensitive to the action of very small amounts (0.05-1.0%) of surfactants. 80 For this reason, it was determined that it is expedient to use the K-61 lubricant to improve the structure and operational characteristics of the gear oil.

The use of reducer drive oils in locomotive gear reducers depends on its composition and rate of deformation gradient, as well as the viscosity of semi-liquid drive materials at high ambient temperatures. It should be emphasized that the solidification of oil at a temperature below 10-30 oC, the presence of a semi-liquid soap mixture structure at a high temperature increases the possibility of the reducer's operation and provides the possibility of its easy start-up.

One of the important conditions for the use of semi-liquid lubricating oils in the traction reducers of the locomotive is to reduce the cost with the service of the lubricating materials in the assembly of the reducer housing, and it meets the issues of shell cracks and densification. The increase in quality indicators in the processes of using reducer lubricants depends on the viscosity characteristics of reducer lubricants.

At the Fergana oil refinery, we used extracts, components of aromatic semi-cycles, compounds of heteroatoms and tar asphalt binders, and natural anti-degradation components, which make up reducer lubricants. Friction of nodes under the influence of opposite forces 85 increases the frictional surfaces of metals and the workability of metal. The composition of such lubricating oils consists of an oil mixture with extracts, which provides the oil with improved tribological properties and dispersion medium. The required density, reducing the number of impurities in the production of surkov oils, has a lot of influence on the composition of the extracts in the structure-forming processes.

For reliable and long-term operation of the mechanism, the following additives are added to the oils:

- viscosity additives around 3% to improve viscosity properties; - for the winter season, depressants (the so-called substance) are added in the amount of 1% to reduce the solidification temperature of oils. They are used to lower the solidification temperature of the oil, which is of great importance for gear oil. They prevent the formation of a crystal mesh when paraffins solidify, reduce the temperature inside the reducer, at such a temperature the mobility of the oil is maintained. An example is the calcium depressant AFK-alkynphenolite.
- 3-10% of washing agents are added to reduce the formation of varnish, soot, sediments, and prevent burns in details at high temperatures. Depressants keep the solids in oils in fine suspension and prevent them from sticking to the metal. Antioxidants are added to prevent oxidation of oils. Oxidation is the most harmful process. Oxidation products can include acids and neutral substances that rust parts, tars, asphaltenes, carbons, carbides. A sulfide compound or a phenol derivative is added. They prevent oxidation of the oil film on hot metal surfaces.
- anti-abrasion mounts - forming a hard film on the surfaces of pairs of metal parts that rub against each other, reducing the 98 or dry friction coefficient and reducing their bending.
- anti-scalding mounts - parts made of the same metal prevent direct contact of their homogeneous surfaces when the specific load is too large. When metal surfaces of the same type that are not protected by an oxide film or other film come into contact with each other, intermolecular forces cause surface friction. Free sulfur in transmission oils has such a property.
- anti-rust fittings. Anti-rust liquids added to oils protect metal surfaces from rust, not oil. They form a thick oil film on the surface of metal parts, the acids and water contained in the oil do not touch the metal surface due to this film;
- Anti-foaming liquid (silicone oil) prevents the oil from foaming. These liquids are insoluble in oils. The effect of antifoam fluid is that the silicone fluid particles burst the air bubbles in the oil;

For the purpose of improving the properties of reducer lubricants contains zinc, chlorine, sulfur, calcium, barium, sodium, phosphorus, iodine, a variety of inorganic and organic substances that are cyclic hydrocarbons will be added. Using some ingredients at the same time, adding them together will not be, because when they are combined together, they will break down, sink, corrosive substances may be formed. According to the quality together with various oils with improving additives cannot be mixed.

Additives to reducer oil are sufficient to be stable, i.e. when the temperature changes when stored

for a long time and should not separate and sink when exposed to water. Installations lubricants with economical use is the only way to increase operational characteristics. So lubricant currently used in operational processes In the preparation of materials, the composition of active devices for them the scientific basis of the benefits of inclusion is being studied.

Surkov oils are 70-55% dispersed in the liquid phase. The properties of Surkov oil are undoubtedly influenced by the semi-liquid phase brings Research results show that different types operating properties of lubricating oils are different, they directly depends on the chemical composition of the oil base. Heavy semi-liquid lubrication in the work of reducers operating under loa in the use of synthetic oils, soapy thickeners 12-oxidstearic acid is suggested. That's it shows that semi-fluid lubricating oils in the laboratory under bench conditions as a result of the conducted research, petroleum-based synthetic oils and sodium thickener, soapy lithium and calcium, convenient in most cases Oils prepared in this mode work for a long time at high temperatures and it is distinguished from other oils by its durability.

Depending on the conditions of use in various types of gears, the use of semi-liquid lubricating oils of synthetic composition at high temperatures can reduce the temperature of the working environment of gear wheels by up to 20 °C. A decrease in temperature in such a working environment leads to an increase in the power of mechanisms.

In conclusion, it can be said that in this article, for the first time, using local raw materials, the technology of preparing gear oil with a new composition for reducers operating under high load has been developed. Changes were made to the technology (nodes) for the industrial scale development of the new composition reducer oil, and the depressant synthesis was based on the by-products of the tar production of the oil refining industry..

REFERENCES:

1. Khamidov B.N., Saidakhmedov Sh.M., Ubaidullaev B.Kh., Djiyanbaev S.V. Main directions of production of lubricants using local raw materials // Uzbek journal of oil and gas. Special. issue 2015.
2. Djiyanbaev S.V., Khamidov B.N., Ubaydullaev B.Kh. of the locomotive Semi-liquid gear oil for heavy-duty units Development // (Fergana Polytechnic Institute "Scientific-Technical journal" ("Nauchno-technicheskii journal FerPI", "Scientific-Technical Journal FerPI») Vol. 20. No. 4 Fergana-2016.
3. Djiyanbaev S.V., Ubaidullaev F.B., Khamidov Sh.B. Transportation Stabilization of alternative working function of tools development of lubrication oils for the purpose of // (TAYI Notice No. 2-3, Tashkent - 2016)
4. Tolaev B.R. "Fuel lubricants and cooling liquids» // Study guide. Tashkent-2003.
5. Ivanov G.N. Instructions for the use of lubricants on locomotives and MVPS. NT-34 "Uzbekistan Railways" DAK, 2013, Tashkent.
6. Evdokimov A.Yu. Fuks I.G. Shabalina T.N. Bagdasarov L.N. "Lubricants and environmental problems" State Unitary Enterprise Oil and Gas Publishing House, Moscow 2000
7. Hamidov B.N., Ubaydullaev B.Kh., Djiyanbaev S.V. "Local raw extracting lubricants from the material» Oil and Gas Journal of Uzbekistan. Issue No. 1 2015.
8. Djiyanbaev S.V., Adilov O.K., Karshibaev Sh.E., Kulmuradov D.I., Samiyev H.Kh. Secondary products of oil and fat production // (Monthly scientific journal "Young scientist", 2015, No. 2, Russia Part 2.
9. Safanov A.S., Ushakov A.I., Yuskovets N.D. Automotive operating materials // St. Petersburg: Gidrometeoizdat, 1998.