



**ФАН ВА ТЕХНОЛОГИЯЛАР
ТАРАҚҚИЁТИ**
**РАЗВИТИЕ НАУКИ И
ТЕХНОЛОГИЙ**



3
2025



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ФАН ВА ТЕХНОЛОГИЯЛАР

ТАРАҚҚИЁТИ

ИЛМИЙ – ТЕХНИКАВИЙ ЖУРНАЛ

РАЗВИТИЕ НАУКИ И

ТЕХНОЛОГИЙ

НАУЧНО – ТЕХНИЧЕСКИЙ ЖУРНАЛ

Журнал Ўзбекистон матбуот ва ахборот агентлиги Бухоро вилояти бошқармасида 2014 йил 22-сентябрда № 05-066-сонли гувоҳнома билан рўйхатга олинган

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Журналнинг тўлиқ электрон варианты билан

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сайти орқали танишиши мумкин.

Ушбу журналда чоп этилган материаллар тахририятнинг ёзма рухсатисиз тўлиқ ёки қисман чоп этилиши мумкин эмас. Тахририятнинг фикри муаллифлар фикри билан ҳар доим ҳам мос тушмаслиги мумкин. Журналда ёритилган материалларнинг ҳаққонийлиги учун мақолаларнинг муаллифлари ва реклама берувчилар масъулдирлар.

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Xulosalar. Bu usul yordamida sirt tozaligini aniqlash orqali mehnat samaradorligiga erishiladi. Mahsulot sifatining aniqligini oshirish va sirt sifatini yaxshilashga erishiladi. Ushbu format bilan ishlash qulay, chunki undan olingan ma'lumotlar turli xil dasturiy muhitlarda ishlatilishi mumkin [4].

Foydalanilgan adabiyotlar:

1. Тополянский П.А., Ермаков С.А., Соснин Н.А., Тополянский А.П. Сравнительный анализ свойств износостойких покрытий для повышения стойкости сверл. Журнал «Металлообработка», №4, (76) / 2013.
2. Федоров С.В. Изнашивание твердосплавных пластин с комплексной поверхностной обработкой при фрезеровании никелевого сплава//Статья,-2017- № 11.1817.2017/ПЧ.
- 3.<http://machine-building.conf.nstu.ru/wp-content/uploads/Sbornik%202015HTML/index.html#310>
4. Хамроев Х.Х., Уринов У.А., Дубровец Л.В., Шадиев С.С., Сайфуллаев С.С. Improving the Efficiency of Milling with using of the Milling Cutter with Cover (High Speed Milling (HSM)). "International Journal of Innovative Technology and Exploring Engineering (IJITEE) 2020".
5. Исаев А.В., Хамроев Х.Х., Пивкин П.М., Минин И.В., Ершов А.А. Исследование высокоскоростной обработки заготовок из чугуна цельными покрытиями и без них. Вестник МГТУ «Станкин» №4 (51), 2019 г.
6. Исаев А.В., Хамроев Х.Х., Дубровец Л.В. Исследование процесса высокоскоростного фрезерования "Фан ва технологиялар тараққиёти". 2019 йил. №5.

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THE INFLUENCE OF OILS ON THE RELIABILITY AND LONGEVITY OF DIESEL LOCOMOTIVE ENGINES

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Abstract. Diesel engines of diesel locomotives play a key role in railway transport, ensuring efficient operation over long distances in various climatic and operating conditions. One of the most important factors affecting the reliability and durability of such engines is the quality and proper selection of lubricants. Oils used for lubrication and cooling of diesel engines of diesel locomotives significantly affect the operational characteristics, wear of mechanisms and the overall duration of their operation. The purpose of this article is to consider the effect of different types of oils on the operating characteristics of diesel locomotive engines, and to analyses the role of oils in ensuring their reliability and durability.

Keywords. Oil, reliability, durability, lubrication, cooling, crankshaft, viscosity, temperature.

DIZEL LOKOMOTIV DVIGATELLARINING ISHONCHLILIGI VA UZOQ MUDDAT XIZMAT QILISHIGA MOYLARNING TA'SIRI

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Annotatsiya. Temir yo'l transportida dizel lokomotivlarining dvigatellari turli iqlim va ekspluatatsiya sharoitlarida uzoq masofalarda samarali ishlashni ta'minlashda muhim rol o'ynaydi. Bunday dvigatellarning ishonchliligi va chidamliligiga ta'sir etuvchi eng muhim omillardan biri moylovchi materiallarning sifati va to'g'ri tanlanishidir. Dizel lokomotivlari dvigatellarini moylash va sovitish uchun qo'llaniladigan moylar ularning ekspluatatsion xususiyatlariga, mexanizmlarning yeyilishiga va umumiy ishlash muddatiga sezilarli darajada ta'sir ko'rsatadi. Ushbu maqolaning maqsadi turli xil moylarning dizel lokomotivlari dvigatellarining ishlash xususiyatlariga ta'sirini ko'rib chiqish hamda dvigatellarning ishonchliligi va chidamliligini ta'minlashda moylarning ahamiyatini tahlil qilishdan iborat.

Kalit so'zlar: moy, ishonchlilik, chidamlilik, moylash, sovitish, tirsakli val, qovushqoqlik, harorat.

ВЛИЯНИЕ МАСЕЛ НА НАДЕЖНОСТЬ И ДОЛГОВЕЧНОСТЬ ДВИГАТЕЛЕЙ ДИЗЕЛЬНЫХ ЛОКОМОТИВОВ

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Аннотация. Дизели тепловозов играют ключевую роль на железнодорожном транспорте, обеспечивая эффективную работу на дальние расстояния в различных климатических и эксплуатационных условиях. Одним из важнейших факторов, влияющих на надежность и долговечность таких двигателей, является качество и правильный подбор смазочных материалов. Масла, используемые для смазки и охлаждения дизелей тепловозов, существенно влияют на эксплуатационные характеристики, износ механизмов и общую продолжительность их работы. Целью данной статьи является рассмотрение влияния различных типов масел на эксплуатационные характеристики двигателей тепловозов, а также анализ роли масел в обеспечении их надежности и долговечности.

Ключевые слова: масло, надежность, долговечность, смазка, охлаждение, коленчатый вал, вязкость, температура.

Introduction. Improvement of diesel oil performance is carried out by improving the qualities of the base oil and the use of additives. According to their effect on lubricating oils, additives are divided into detergent (dispersing), antioxidant, anticorrosive, viscosity depressant, etc. Diesel oils have different degrees of viscosity changes from temperature. These changes characterize the viscosity-temperature properties of oils and are assessed by the viscosity index.

The role of oils in the operation of diesel locomotive engines. Oil fulfils several key functions in a diesel engine:

Lubrication: The oil forms a protective film on moving engine parts such as pistons, rings, crankshaft, bearings, which reduces friction and wear and reduces the likelihood of overheating.

Cooling: Oil helps maintain optimum operating temperature by dissipating heat from highly loaded engine components.

Cleaning: Oil helps remove dirt and wear products such as metal particles and soot that can accumulate during operation.

Corrosion protection: The oil prevents the formation of rust and corrosion on the metal surfaces of the engine, especially in conditions of high humidity or aggressive external factors.

Methods. Impact of oil quality on engine reliability and durability. The choice of oil directly affects the engine performance, its efficiency and durability. Let us consider the main parameters that determine the influence of oil on the reliability and service life of diesel locomotive engines.

Oil viscosity: - is the ability of the fluid to resist flow. Oil with optimum viscosity ensures stable engine operation at different temperatures. Oil that is too thick can lead to difficulty in starting the engine, while oil that is too thin will not provide adequate wear protection. Using an oil with the wrong viscosity can cause increased friction and wear on mechanisms, which reduces performance and engine life.

Heat resistance: The most important characteristic for oils used in diesel locomotive diesel engines is heat resistance. Diesel engines operate at high temperatures and the oil must retain its

properties under overload and high temperatures. Oils with low temperature resistance can degrade, forming sludge and acids, resulting in accelerated wear of engine parts and reduced engine reliability.

Anti-oxidation properties: The oil must be able to resist oxidation and slime formation, which is particularly important in conditions of high temperature and contact with air. Oxidation of the oil causes it to thicken, as well as the formation of solid particles that can lead to clogged oil passages and impaired engine performance. Oils with good antioxidant properties help maintain stable engine performance for longer periods of time.

Foaming Resistance: Diesel engines in diesel locomotives may experience conditions that favour the formation of foam in the oil. This can lead to lubrication failure, overheating and damage to critical engine parts. Oils with good anti-foaming properties prevent foaming, ensuring stable lubrication and cooling performance.

Influence of oil on engine components. A diesel engine consists of many components that are subjected to various mechanical and thermal stresses. Oil affects their wear and durability in the following ways:

Crankshaft: Oil creates a protective film that prevents wear and overheating of the crankshaft, especially under high loads and speeds. It also helps improve heat transfer and cooling of this component.

Pistons and rings: The oil helps reduce friction between the pistons and cylinders, which reduces wear and prevents scoring. This is especially important in the high operating temperatures and pressures found in diesel locomotives.

Bearings and valves: Oil lubricates bearings and valves, which reduces wear and ensures reliable operation over long periods of time. Improper oil selection can lead to accelerated wear of these components and shorten engine life.

The technical condition of the diesel engine lubrication system and its components largely determines the fulfilment of its main functions: reduction of friction losses; washing out of wear particles; heat dissipation. All these functions are fulfilled by the oil pumped through the system. Oil itself, as the operation can accumulate dust, wear particles, water, soot and resins penetrating into the crankcase, which in turn can lead to increased wear of friction units, overheating and their failure. Crankshaft bearing failure entails such consequences as crankshaft failure, piston and cylinder scoring. The causes of bearing unit failure can be ovalisation, corseting and barrel-shaped surfaces of journals and surface of antifriction layer, distortion of mutual position of shaft and bore axes. During operation these changes are caused by operating modes, thermal condition of the engine, quality of lubricating oil. One of the ways of indiscriminate diagnostics of crankshaft bearing units is the use of thermal-hydraulic parameters, which include pressure and temperature of the oil layer. The overpressure that occurs when the shaft moves relative to the liner is determined by the clearance and surface condition. Both design parameters change as the assembly is operated, determining the amount of pressure in the layer at a particular measurement location. The disadvantage of this method is that it requires a constant speed and power, since oil pressure depends on these parameters in addition to oil properties and temperature.

Results. Oils and operating conditions in “O‘zbekiston temir yo‘llari” JSC. In the operating conditions of diesel locomotives at in “O‘zbekiston temir yo‘llari” JSC, an important factor is the influence of climate and operation in different conditions on the choice of oils. In hot and dry regions, high temperatures can cause accelerated oil ageing, while in cold regions there may be a problem with the starting properties of the oil. It is recommended to use oils that comply with international standards and the requirements of diesel engine manufacturers. It is also important to consider the specifics of diesel locomotive operation, including frequent starting modes, long mileage and different climatic conditions, which may require regular oil and filter changes, as well as the use of specialized additives to improve oil properties.

Current trends in the selection of oils for diesel locomotive diesel engines. Modern technology and research are leading to the development of new types of oils with improved characteristics. For example, synthetic oils have high temperature resistance and can operate at higher temperatures than traditional mineral-based oils. Oils are also being developed with additives that prevent fouling and corrosion and improve wear protection under high temperatures and loads.

To diagnose the impact of oils on the reliability and durability of diesel locomotive diesel engines on the railway network of “O‘zbekiston temir yo‘llari” JSC, several key studies and analyses can be conducted to assess the impact of different types of oils on the operation of diesel engines and their performance characteristics. The main aspects to be considered are:

1. Types of oils used in diesel engines.

Engine oils: Various types of engine oils are used for locomotive diesel engines, such as high-performance diesel engine oils.

Use of synthetic or semi-synthetic oils: These oils provide improved lubrication, especially at high temperatures, which can extend engine life.

Preservation oils: Special preservation oils may be used during storage and off-season to protect against corrosion.

2. Parameters for diagnosing the effects of oils.

Oil temperature: Study of the temperature behavior of the oil during diesel operation and its effect on friction and wear. High temperatures can degrade oil properties and reduce oil performance.

Wear of engine components: The use of oils is directly related to the wear of rubbing parts (pistons, cylinders, turbines) and it is important to diagnose these processes.

Fouling: under certain conditions, oils can lead to the formation of deposits (fouling, soot) which can reduce the efficiency of the diesel engine and increase the stress on components.

Impurities: It is important to control the presence of contaminants in the oil, such as metal or water particles, which can accelerate wear.

Physical and chemical characteristics of the oil: Example parameters that should be monitored include viscosity, acidity, alkaline number (TBN), soot and water content, and the oil's ability to lubricate over different temperature ranges.

3. Oil and filter change intervals.

Determining the optimum oil and filter change intervals to avoid over consumption of oil and maintain diesel engine reliability. Usually for diesel engines of railway locomotives, recommendations are made on the basis of hours worked.

4. Analysis of accidents and failures.

Investigation of the statistics of diesel engine failures and breakdowns associated with the use of substandard or inappropriate oils. This includes diagnosing cases of overheating, blocked filters, loss of engine power and other critical situations.

5. Testing and quality control of oils.

Conducting laboratory analyses of oils for their physical and chemical properties. This includes the use of indicators such as:

- Viscosity at different temperatures.
- Content of water, soot, metals and other impurities.
- Changes in acid number during the life of the oil.
- Regular measurements help to prevent the use of oil with degraded properties, which helps to reduce the risk of breakdowns.

6. Analyzing the interaction with other engine components.

Examine the effect of oil on lubrication system components including pumps, filters, radiators and cooling systems. Poor quality oil can adversely affect cooling efficiency and lead to overheating.

7. Recommendations for improving and selecting oils.

Selecting oils with improved performance characteristics such as antifriction additives, improved oxidation resistance, corrosion protection and viscosity stability.

Consideration of switching to newer oils (synthetic or semi-synthetic) to improve diesel reliability and service life.

8. Monitoring and maintenance.

Implement a system of regular oil condition monitoring, which includes the use of sensors and oil analyses based on diesel performance data.

Organization of regular technical inspections and oil analysis at the service station.

And (&) Discussion. To ensure reliability and durability of diesel locomotive diesel engines in conditions of operation on the railways of JSC “O‘zbekiston temir yo‘llari” it is necessary:

Regularly monitor the condition of oil and its quality.

Observe recommendations on oil change and its filtration.

Carry out laboratory analyses and adjust the use of oils depending on the results.

Observe the operating conditions (temperature fluctuations, frequency of operation, load) when selecting oils for diesel engines.

Thorough diagnostics and adherence to the recommendations on oil selection and use will significantly increase the longevity of diesel engines and reduce the number of breakdowns.

Conclusion. Oils play a critical role in ensuring the reliability and durability of diesel locomotive engines. Correct selection of the right oil for the operating conditions ensures efficient engine operation, reduces wear and tear on parts and extends the service life of the locomotive. In JSC “O‘zbekiston temir yo‘llari”, where diesel locomotives are operated in various climatic and operational conditions, it is important to be attentive to the choice of oils, as well as to monitor their condition and regular replacement. Advances in lubricant technology are opening up new opportunities to improve the reliability and efficiency of diesel locomotive diesel engines.

References

1. Seregin V.A. Maintenance and repair of diesel engines / V.A. Seregin. - Moscow: Mashinostroenie, 2002. - 360 p.
2. Berezin A.N.; Polyakov V.I. Diesel engines of diesel locomotives / A.N. Berezin, V.I. Polyakov. - Moscow: Transport, 2005. - 420 p.
3. Yakovlev I.N.; Grigoriev A.P. Influence of the engine oils quality on the diesel engines parts wear / I.N. Yakovlev, A.P. Grigoriev. // Technical operation of transport. - 2018. - № 12. - p. 45-50.
4. Kuznetsov V.E.; Makarov I.V. Comparative analysis of the performance characteristics of motor oils for diesel engines / V.E. Kuznetsov, I.V. Makarov. // Mashinostroenie. - 2020. - № 4. - p. 30-35.
5. Gusev I.L. The role of oils in increasing the resource of diesel engines / I.L. Gusev. // Energy and transport. - 2017. - № 5. - p. 70-75.
6. Otabek Khamidov, Nuriddin Zayniddinov, Shohijakhon Kudratov and Burkhonjon Erkinov (2024). Analysis of malfunctions that occur in the crankshaft of locomotive thermal power plants during operation. In E3S Web of Conferences (Vol. 538, p. 01027). EDP Sciences. E3S Web Conf., 538 (2024) 01027.