MAINTENANCE OF TRANSMISSION UNITS AND TRANSMISSION OILS IN MOTOR VEHICLES

Bobir Tagaev
Master
Tashkent State Technical University named after Islam Karimov
Republic of Uzbekistan, Tashkent
E-mail: gulchehra2767@mail.ru

ТЕХНИЧЕСКОЕ ОБСЛУЖИВАНИЕ ТРАНСМИССИОННЫХ УЗЛОВ И ТРАНСМИССИОННЫХ МАСЕЛ В АВТОТРАНСПОРТНЫХ СРЕДСТВАХ

Тогаев Бобир Зокир угли
магистр
Ташкентский государственный технический университет имени Ислама Каримова
Республика Узбекистан, г. Ташкент

ABSTRACT

The article deals with the repair of transmission parts and the use of transmission oils in road transport, transmission unit parts, their defects, types of transmission oils, their advantages and disadvantages, ensuring high quality performance of vehicles, improving performance.

АННОТАЦИЯ

В статье рассматриваются ремонт деталей трансмиссии и применение трансмиссионных масел на автомобильном транспорте, детали агрегатов трансмиссии, их дефекты, виды трансмиссионных масел, их достоинства и недостатки, обеспечение качественной работы транспортных средств, повышение эксплуатационных характеристик.

Keywords: motor transport, transmission units, maintenance, transmission oils, friction, wear, engine power, gearbox.
Ключевые слова: автотранспорт, агрегаты трансмиссии, техническое обслуживание, трансмиссионные масла, трение, износ, мощность двигателя, коробка передач.

The power gained by the engine is transmitted to the drive wheels via several transmission units and mechanisms. During transmission, part of the torque is used to overcome the resistance of the aggregates and mechanisms that make up the transmission.

The resistance is mainly due to the friction of the gears. Transmission consumes up to 10-15% of the engine power to overcome such harmful resistances. Transmission oils are used to lubricate the gears of vehicles, such as gearboxes, drive axles, on-board transmissions, gearboxes, steering and steering gears.

Major overhaul of transmission units includes the following operations: pre-cleaning, washing and partial disassembly of units, washing them in a partially disassembled state, disassembly of units, detection of defects and separation of parts into serviceable and unserviceable and repair requirements , restoration of details, assembly of assemblies, assembly, painting, adaptation to each other using details. Disassembly has a significant impact on the quality of reusable parts.

This work should be carried out at appropriate posts, quality assembly and disassembly facilities. The use of steel hammers and the use of impact forces during the installation and removal of bearings are prohibited. Small parts (washers, sugars, etc.) are washed and degreased in a boiling solution.

Gearbox repair. When the car's forward transmission is noisy and the transmissions do not engage properly (this is as of the synchronizer ring becoming unusable), the outer and side surfaces of the synchronizer clutch teeth, bearings, shafts are worn, and the gear teeth are broken.

Depending on the condition of the worn parts, they were replaced (with a pair of joints) and repaired.

Replacing the parts ensures that the transmission works for a long time without damage, resulting in less maintenance. Special tools are used to remove the synchronizer hub and other details of the transmission gear.

The main function of transmission oils is to reduce wear on the working surfaces of the gear teeth and friction costs on the transmission units, cooling the parts and protecting them from corrosion. In addition, transmission oils must reduce the effects of impact loads, noise from the gears and their vibration, and seal cracks in seals and various joints. Transmission oils are mainly obtained from tar and semi-tar from the residual products of oil refining.

Transmission oils are highly viscous and viscous black liquids with a density of 900-935 g / cm^3.

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The operating conditions of transmission oils are drastically different from the operating conditions of engine oils. First of all, the friction surfaces of gear, conical, cylindrical, worm gears have a specific load of 1500-2000 MPa, which is much higher than in the engine, and even 4000 MPa in hypoid gears.

The slip speed is high between the friction pairs in the engine, but the relative slip speed is not very high (not more than 2.5-3.0 ms) in the gear transmissions of the transmission and the operating temperature is 80-100 ^{0}C.

Due to the increase in engine power and the use of machines, the operating temperature in the transmission units rises and sometimes reaches 125-140 0C. In addition to intensive oxidation, the hydrocarbons in the oil are thermally decomposed.

Most transmission oils are made from a mixture of distillate (i.e., obtained by driving) and residual sulfuric oils (hence the unpleasant sulfur odor).

To improve the lubricating properties, a small amount of asphalt resin is left in the oil (such oils become black).

The presence of sulfur in the oil reduces the wear, but in addition, anti-scratch and anti-friction compounds are added to the oil, which are different from those added to engine oils. In this case, sulfur, phosphorus and nitrogen compounds, lead, zinc, aluminum, metal-organic compounds with molybdenum, animal and vegetable oils, fatty acids, their esters, resinous and petroleum acids, etc. is used. Transmission oil may contain antioxidant, anti-corrosion and depressant compounds.

Base oils based on esters or polyalphaolefins, as well as those obtained by hydrocracking oil, have the most stable quality and allow you to create products with a high resource: a package of additives, inevitably aging and collapsing during operation, needs to be introduced in a smaller volume. The basic properties of the oil can be "programmed" as part of the base itself, so synthetic transmission oils are considered to be the best in terms of their operational properties.

Picture 1. Synthetic transmission oils

But most of the advantages of synthetic transmission oils are revealed only in demanding units operated under high loads or in extreme conditions. Therefore, synthetic oils, which are the most expensive, are not always advisable to use, and pouring them into aggregates designed for mineral options does not give a noticeable increase in resource. Classification by applicability. Due to radically different operating conditions, transmission oils for mechanical transmissions and automatic transmissions are produced according to different standards. For mechanical transmissions, API classification is the most widespread. The brand of transmission oils used for cars begins with the letter TA.

TAD-17I. The letter "D" means that the oil contains not only residual oil, but also distilled oil. The letter "I" means that the oil contains complex compounds that provide anti-corrosion and anti-foaming properties.

TAP-15V. The letter "P" means that the oil contains impurities. The letter “V” indicates that the composition is better than the previously developed TAP-15 oil.

Currently, the best transmission oil is TAD-17I. It can be used in all transmission units, including the steering gear.

Conclusion. Repair of transmission parts and transmission oils in road transport.

The power gained by the engine is transmitted to the drive wheels via several transmission units and mechanisms.

During transmission, part of the torque is used to overcome the resistance of the aggregates and mechanisms that make up the transmission.

Transmission oil can contain anti-oxidant, anti-corrosion and depressant compounds.

Transmission oils are mainly derived from tar and semi-tar from residual oil refining products.

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