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TECHNICAL STATE OF AUTOMOBILE TRACTORS AND MAIN FACTORS INFLUENCING THEM

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Abstract: The article covers issues of efficient operation, maintenance, and high-quality repair of friction parts in the context of the rapid development of the automotive industry of Uzbekistan. Based on the Development Strategy for 2022-2026 and relevant regulatory legal documents, the need to modernize automotive units and mechanisms, increase their working life, and apply energy and resource-saving methods in technological processes is substantiated. The causes of types of wear of internal combustion engine parts - abrasive, corrosion-mechanical, and molecular-mechanical wear, as well as their influence on the efficiency of vehicle operation, are analyzed. The importance of technological solutions and the improvement of grinding and grinding processes to reduce the wear processes of the elements of the cylinder-piston group is also shown.

Keywords: automotive industry, internal combustion engine, wear process, abrasive wear, corrosion-mechanical wear, cylinder-piston group, maintenance, resource-saving technologies, repair quality.

In our republic, along with the development of the automotive industry, large-scale measures are being implemented and certain results are being achieved for the efficient operation of cars used in the national economy, their maintenance and high-quality repair of parts, the use of friction structures that allow for effective smoothing of working surface roughness, and the development of energy- and resource-saving equipment and technologies. The New Uzbekistan Development Strategy for 2022-2026 defines important tasks, including "Reducing losses in industrial sectors and increasing the efficiency of resource use." In the implementation of these tasks, including technological modernization of working bodies, reducing operating costs and reducing their cost by bringing the resource of working bodies to the level of the resource of working bodies produced by leading world enterprises, is of great importance [1].

Decree of the President of the Republic of Uzbekistan dated January 28, 2022 No. UP-60 "On the Development Strategy of New Uzbekistan for 2022-2026" , Decree of the President of the Republic of Uzbekistan dated February 1, 2019 No. UP-5647 "On Measures for the Fundamental Improvement of the Public Administration System in the Field of Transport" and Resolution of the President of the Republic of Uzbekistan dated July 18, 2019 No. PP-4397 "On Additional Measures for the Accelerated Development of the Automotive Industry of the Republic of Uzbekistan" and other regulatory legal documents related to this activity. This research work serves to a certain extent in the implementation of these tasks, including the creation and improvement of existing technical means and equipment used in the technological operations of rolling and grinding of friction pairs of parts, which improve the quality of repair of internal combustion engines and are the final technological operation of the repair process [2].

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A vehicle is a complex system of units and mechanisms that move together, ensuring the fulfillment of the tasks assigned to the vehicle in operation.
A car, unit, mechanism, part can be combined into a general concept such as an object or item[3,4]. Modern cars of the middle class used today approximately consist of 15-18 thousand parts, of which approximately 7-10 thousand lose their original properties during operation. In this case, about 3-4 thousand parts have a relatively short service life compared to the vehicle itself and require special attention during operation. The reliability of 200-400 of these parts is extremely low, requiring faster 'repair orreplacement, which, in turn, leads to longer downtime of vehicles during operation, increased consumption of labor, materials, and spare parts. In modern cars, the total cost of parts, which are most commonly replaced and account for 2-3% of the total cost of spare parts, is approximately 40-50% of the total cost of all used spare parts, 8-9% is 80-90%, and 20-25% is 95-98%. From this, it is evident that reducing the consumption of spare parts to increase the efficiency of vehicle operation is one of the most important issues.
As is known, vehicles with internal combustion engines have been the main driving force in the world for many years. In 1900, the number of cars with internal combustion engines was 22% (40% - steam and 38% - electric motors), and by 2000 - 99.9% [6].
Internal combustion engines are the most difficult parts of the units and mechanisms that make up cars. As a result, the friction parts of the engine wear out relatively quickly and the technical condition of the engine deteriorates. Therefore, the service life of vehicles'indicator is evaluated primarily by the wear of internal combustion engine, friction partsy.
Technical condition of motor and tractor engines
The technical condition of internal combustion engines is characterized by their quality indicators (see Fig. 1). Internal combustion engineis determined by inspection without disassembly and by checking their operation in different modes, by checking the passage of exhaust gases into the engine crankcase, checking oil consumption and its quality change, and measuring compression in the engine cylinders.
A technically sound engine must operate stably at idle and have maximum power when the gas throttle is fully open, preventing overheating, smoke, or oil leakage between the compressed joints. The most worn elements of the engine are cylinders, piston rings, pistons, crankshaft and its bearings.
Corrosion-mechanical and abrasive wear y occurs in the part of the cylinder piston group (CPG), and according to recent studies, the leading type of wear yof this part is abrasive wear y. In places where the continuous oil film is damaged (in the upper part of the cylinder), abrasive and corrosion-mechanical ywear can occur simultaneously with wear, molecular-mechanical ywear, and in some cases, even cracks on the metal surface.
Corrosion-mechanical wear of the SPG part y. Friction parities are associated with the presence of aggressive substances - gaseous and liquid fuel products, which under the influence of high temperatures lead to the formation of brittle oxide films.
Uneven wear on the transverse surface of the cylinders ydepends on the direction of the flow of the combustible mixture, its contamination, uneven cylinder temperature along the circumference, piston ring pressure, cylinder deformation, etc. ta'secrets. The greatest wear zone y usually occurs in the plane perpendicular to the crankshaft axis, located opposite to the intake valve.

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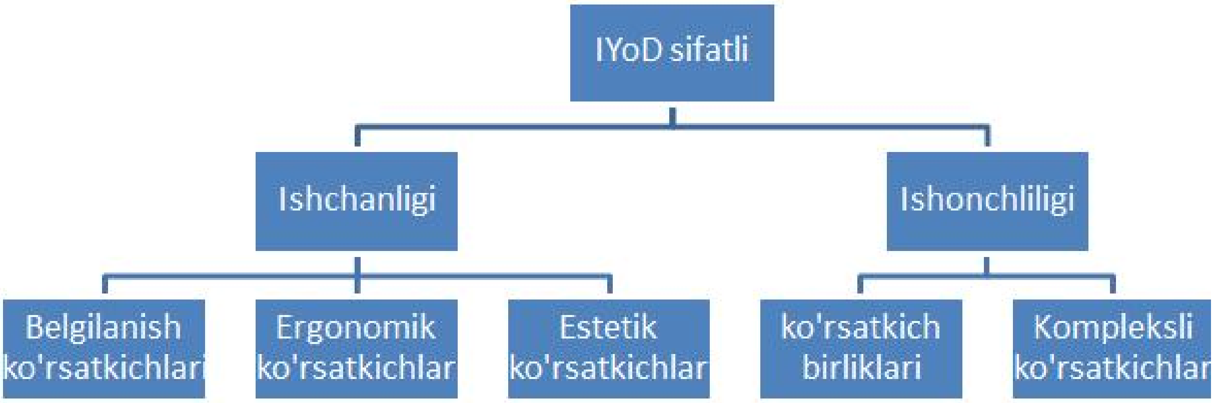

Figure 1. Quality indicators of internal combustion engines.

As can be seen from Figure 1, the quality indicators of internal combustion engines after production and repair mainly depend on their operability and reliability.

It consists of 3 parts. These include designation indicators, ergonomic indicators, and aesthetic indicators.

Reliability consists of 2 parts. These consist of indicator units and complex indicators.

As is known, ywear is the process of gradually changing the dimensions of parts due to ng friction during the operation of machines. In this case, as a rule, the shape and position of the working surfaces of the parts change.

Wear is assessed by the rate of change in the dimensions of parts per unit of time or relative to the distance traveled (μm/hour, μm/thousand km).Wear is expressed by the amount of wear yand is measured in linear, volumetric, and other dimensions or by weight. For many parts, ywear is represented by an increasing curve (see Figure 2).

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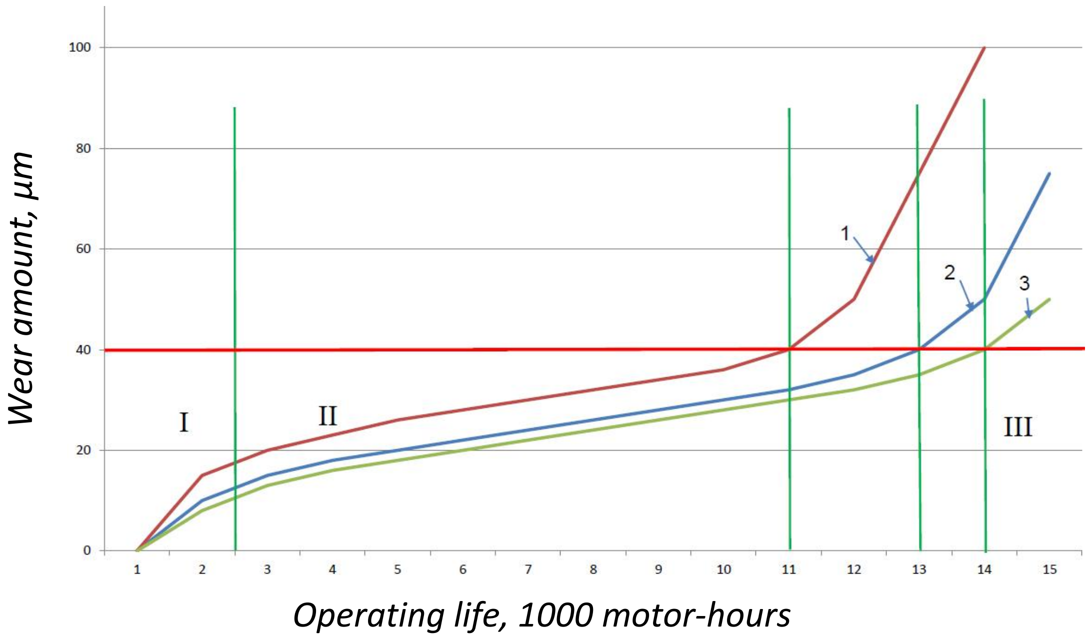

Figure 2. Wear curve over time
I - hardening period. II-period of stable wear. III-period of intensive wear.

As can be seen from Figure 1 above, if the hardening is performed poorly, the duration of the steady-state period of operation of the part is from 2.5 to 11 values (line 1), if the hardening is performed of average quality, the duration of the steady-state period of operation of the part is from 2.5 to 13 values (line 2), and if the hardening is performed qualitatively, the duration of the steady-state period of operation of the part is from 2.5 to 14 values.
γ During the fitting period of the parts, the surface with technological roughness, formed on its friction surface, is smoothed and transformed into an operational surface, where surface wear increases monotonically to a value of = const, corresponding to the period of stable wear, and transitions to the second period of stable wear.

Stable ywearing period, unless there is a serious reason leading to a sharp change in its parameters, ywill persist steadily at an average constant linear rate until it reaches the specified limit of wear.
The third trend yduring the wear periodyafter the amount of wear reaches a certain limit value, under the influence of related factors, ythe wear rate increases sharply. Therefore, for automotive parts, especially internal combustion engines, a transition to an intensive wear period y is not allowed. In this case, in case of y, the vehicle will be discontinued and u repaired.
It is known that at the beginning of operation and after repair of a new car, it is necessary to harden the friction parts and joints so that they fit into each other. Quality of spolishing during rolling significantly affects the duration of the second stable ywear period of parts. That is, if the polishing of the part is performed poorly, then at the end of this period the wear y of the part will be greater, and since the limiting wear y of the part is constant and has a certain value, the service life of the part up to the limiting wear y will be significantly less than the service life of a

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quality hardened part up to the limiting wear y. This can be seen from curves 1, 2, and 3 in Figure 1.2. That is, if the grinding is performed poorly, the period of stable operation of the part will be from 2.5 to 11, if of average quality - from 2.5 to 13, and if of high quality - from 2.5 to 14.

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