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The seeds, separated from the fibers collected in the middle of the working chamber, are removed through the holes of the mesh drum.

Conclusion. As a result of the scientific research, it will be possible to get into the working chamber of the gin machine in time. At the same time, in the working chamber of the gin machine, the tension of the raw shaft remains the same. In the process of separating the fiber from the seed, it is possible to avoid damage to the seed and various defects do not form in the fiber.

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5. Patent FAP 00808 Patent ribs with riffles.
6. Patent IAP 06900 Saw Gin Working chamber

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RESULTS OF THE STUDY ON CHANGES IN THE PERFORMANCE INDICATORS OF ENGINES WHEN OPERATING IN DIESEL AND GAS DIESEL MODES

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Abstract:

Objective. It is a study of the influence of the use of various fuels on engine performance and the performance properties of oils.

Methods. During the research, the laws of lubrication theory, methods of planning experiments and mathematical statistics, as well as methods based on existing regulatory documents were used. When processing the experimental data, processing methods were used on the Microsoft Office Excel application packages.

Results. The operation of engines running on gaseous fuels compared to gasoline and diesel engines is characterized by a significant increase in oil service life.

The most promising source of fuel for internal combustion engines can be gaseous fuels, however, their extremely poor motor properties should be taken into account if they are used in diesel engines. The methods used for using gaseous fuels do not require additional design changes or costs for obtaining fuel. The most optimal method in this situation may be to use it in gas-diesel mode in conjunction with the use of a pilot dose of diesel fuel.

To reduce the wear rate of cylinder-piston group parts, methods of adding functional additives to motor oils are used in the diesel operating process; the introduced additives significantly increase the life of motor oils.

Conclusion. For high-speed gas diesel engines, gaseous fuel can be used as a replacement for liquid diesel fuel. The advantage of gaseous fuel is the possibility of obtaining similar motor properties and a comparative improvement in performance indicators; there is a significant reduction in wear products in the oil, a reduction in soot emissions, which lead to contamination of the engine oil and an increase in harmful emissions to the atmosphere.

Keywords: alternative, diesel, gaseous, gas diesel, additive, pollution, concentration, oil, methanol, engine.

Introduction. The Government of the Republic of Uzbekistan has adopted a program for the efficient use of energy resources. A rational solution to this problem is the use of non-traditional types of energy, in particular motor fuels [1,2]. According to the results of most researchers, alternative motor fuels in the future will become a substitute for existing types of motor fuel. Petroleum fuels are extremely important due to ease of use and good combustion control in power plants.

Reducing reserves of liquid standard petroleum fuels poses the task of developing methods for using alternative types of fuels. Gaseous fuel in a liquefied and compressed state can become a substitute for used petroleum fuels. Currently, the vehicle fleet and the agricultural machine and tractor fleet are increasingly being converted to gaseous fuels. This activity requires thorough scientific research in order to determine the environmental and energy performance of internal combustion engines and establish rational service life of motor oils.

Methods. During the research, the laws of lubrication theory, methods of planning experiments and mathematical statistics, as well as methods based on existing regulatory documents were used. When processing experimental data, processing methods using Microsoft Office Excel application packages were used.

The operation of engines running on gaseous fuels compared to gasoline and diesel engines is characterized by a significant increase in oil service life.

The most promising source of fuel for internal combustion engines can be gaseous fuels, however, their extremely poor motor properties should be taken into account if they are used in diesel engines. The methods used for using gaseous fuels do not require additional design changes or costs for obtaining fuel. The most optimal method in this situation may be to use it in gas-diesel mode in conjunction with the use of a pilot dose of diesel fuel.

To reduce the wear rate of cylinder-piston group parts, methods of adding functional additives to motor oils are used in the diesel operating process; the introduced additives significantly increase the life of motor oils.

As a result of laboratory tests, it was revealed that the products contained in the oil when using standard liquid fuel and gaseous fuel have particles of different sizes and shapes (Table 1).

Wear products with smaller sizes when operating on diesel fuel were identified in the form of graphite-like resinous substances. Depending on the operating time of the engine, the concentration of large particles in the engine oil increases sharply and then decreases.

The bulk of wear products consists of iron and contributes to an increase in the total mass. The results of the analysis are presented in Table 1.

Table 1.

Results of the analysis of determining the content of wear products when operating engines on diesel and gaseous fuel

Engine operating time, Moto-hour	Particle size when operating on diesel fuel, microns		Размер частиц при работе на газообразном топливе, мкм	
	large	small	large	small
100	60	30	52	32
200	100	50	102	48
300	130	65	128	64
400	142	75	140	74
500	145	85	144	83

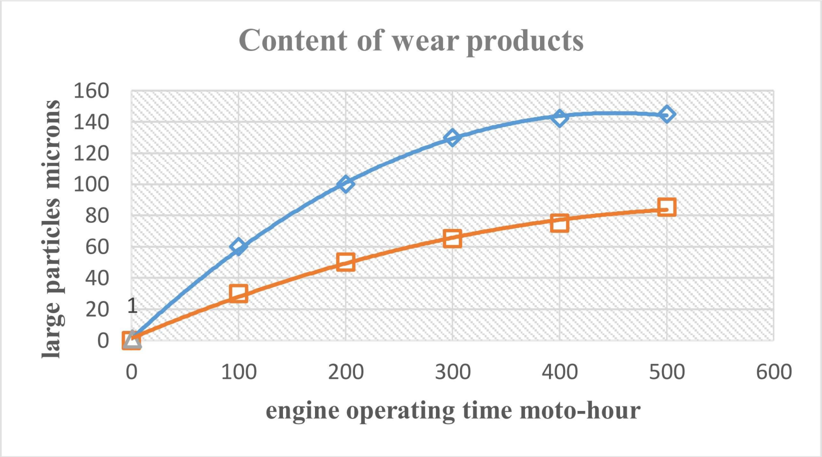

Fig.1. Graphic representation of wear of parts of the cylinder-piston group depending on the concentration of sediment and varnish formation in the oil when operating on diesel fuel., (1-large particles; 2-small particles)

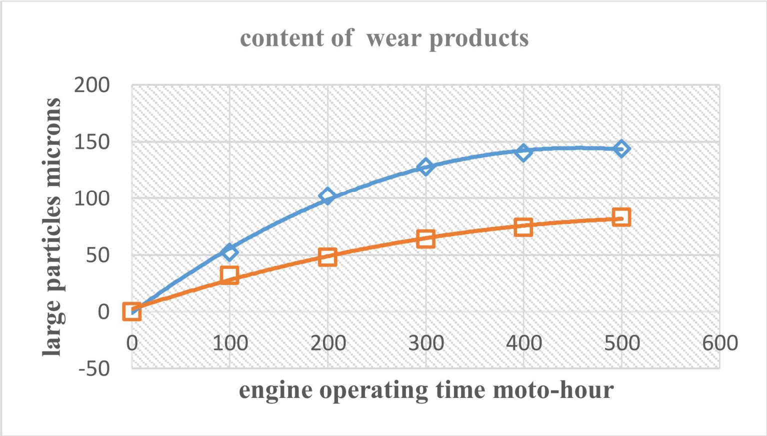

Fig.2. Graphic representation of wear of parts of the cylinder-piston group depending on the concentration of sediment and varnish formation in the oil when operating on gaseous fuel. (1-large particles; 2-small particles)

Changing the shape and surface coating of the engine cylinder-piston group parts and choosing compatible additives in the engine oil, you can improve the lubricating properties of oils on the surface of the mating parts, achieving rational wear characteristics of the cylinder-piston engine group.

Experience has shown that contaminants in motor oil consist of particles with a metal base and particles of organic compounds - varnish, similar in structure to graphite. When using diesel fuel with optimal concentrations, less varnish was formed, because wear decreases to a lesser extent (Fig. 1).

Wear details of the cylinder-piston group when operating on gas-abrasive fuel depend on the acceleration and load modes. Thus, the average wear rate at idle speed is 6.2...9.9 times less than at maximum load. At the maximum speed mode and load, the concentration of iron (Fe) in the composition of engine oil running on standard fuel increased from $1.1 \cdot 10^{-4}$ to $7.8 \cdot 10^{-4}$ g/hour, which is 8-12% more, than when working on conventional fuel.

The wear of the upper compression ring over 400 hours of operation was 0.255–0.470 g, i.e. 4–7% less than when the engine was running on standard fuel.

Dispersion analysis of the oil showed the presence of large (3-4 microns), medium (0.8-1.5 microns) and small (0.4-0.8 microns) particles; and the number of medium particles is 85-90% of the total number of particles [5]. As the thermal stress of the engine increases, there is a slight increase in the average size of contaminant particles.

During engine operation, engine oil loses its properties, i.e. is aging [4,5, 8, 9]. During the oxidation process in oils, all their physicochemical and operational properties change: viscosity, flash point, alkaline and acid numbers, content of insoluble sediments [9].

During the operation of power plant engines, thermochemical processes actively develop in oils, leading to a decrease in their quality due to the activation of additives and the accumulation of transformation products in oils (insoluble products - organic and inorganic acids, etc.) [7]. The aging of motor oils largely depends on the design features of the engine and the specifics of the working process occurring in it [7].

In fresh motor oils, mechanical impurities are contained in an amount of no more than 0.015-0.02%; their content is determined according to GOST 6370-2000 by filtering a sample of oil diluted with gasoline. The filter paper cake is washed with gasoline, dried, weighed, and impurities are expressed as a percentage. The rate of oil contamination depends on the engine power, operating mode, the degree of its wear, and the quality of the fuel and oil used.

According to available data [4-10], the rate of oil contamination, a- for diesel engines is 0.02-0.06 g/l.h.h. According to [12] and others, for diesel engines the pollution rate is a = 0.01-0.06 g/hp/h. But when the engine operates with smoky exhaust, the pollution rate can increase up to a = 0.02-0.03 g/l.h.h. [11,12].

The study of patterns of engine oil contamination has been the subject of a number of studies [12]. One of the first studies in this area was a study conducted by Z.M. Minkin. In addition, it is necessary to pay tribute to the research conducted by G.A. Morozov [12].

The research of this author takes into account the relationship between the possible content of contaminants in the oil, the rate of contamination, the parameter of the oil system and the operating time of the diesel engine [12]. For theoretical studies, you can use equations describing changes in the concentration of oil contamination.

If the impurity content is expressed in %, then the formula will look like [8,12]:

$$x = \frac{100a}{Q_y}(1 - e^{-\frac{Q_y \tau}{G}}) \quad (1)$$

The actual rate of entry of contaminants directly into the oil will be, *a (1- f)*. Then formula (1) will take the form [6,7,9]:

$$x = \frac{100a(1-f)}{Q_y}\left(1 - e^{-\frac{Q_y \tau}{G}}\right) \quad (2)$$

In addition to the formulas discussed above, a number of researchers have proposed other expressions for the dependence of the contaminant content in oil on engine operating time and oil exchange conditions. So, for example, A.P. Solovsky [12] proposed a simplified formula to determine the concentration of pollution:

$$\text{x} = \frac{a\tau}{G + Q_y \cdot \tau} \quad (3)$$

When calculating the content of oil contaminant concentration, the results of calculations of changes in contaminant concentration depending on the duration of oil operation were used. The relationship between parameters can be represented as a graph *x* = f (T).

Discussion. Thus, according to the results of laboratory studies, particular interest was shown in the determination of iron in the composition of oil. In addition, the composition of engine oil contains metals such as calcium, magnesium, aluminum, sodium, and potassium in a certain amount, which makes up the concentration of wear products.

You should pay attention to the high content of the above elements, which is probably all due to the presence of additives in the oil.

Theoretically, the amount of contaminants is determined depending on the operating time of the oil. In the first 240 engine hours of operation, the concentration increases rapidly. As it turned out from the research results, the concentration of contaminants depends on the duration of operation of the oil and the operating conditions of the engine.

Conclusions. For high-speed diesel engines, gaseous fuels can be used as fuel. The advantage of gaseous fuel is the possibility of obtaining similar motor properties and a comparative improvement in performance indicators; there is a significant reduction in wear products in the oil, a reduction in soot emissions, which lead to engine pollution and an increase in harmful emissions to the atmosphere.

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C O N T E N T S

PRIMARY PROCESSING OF COTTON, TEXTILE AND LIGHT INDUSTRY

GROWING, STORAGE, PROCESSING AND AGRICULTURAL PRODUCTS AND FOOD TECHNOLOGIES