

## SAVING RESOURCES IN THE OPERATION, MAINTENANCE OF AUTOMOTIVE EQUIPMENT

Khodjaev S.M.

Senior Lecturer

Fergana Polytechnic Institute

+998906039133 sanjar.xodjayev017@gmail.com

Rakhmonova S.S.

Student

Fergana Polytechnic Institute

+998900440608 shaxrizada.2001@mail.uz

### Annotation

The article discusses the simplest and most effective methods of saving resources in the operation and maintenance of vehicles. Methods for saving fuel consumption, maintenance, spare parts and materials were considered.

**Keywords:** Automotive equipment, operation, maintenance, fuel consumption, consumables and spare parts.

### Introduction

Everyone knows that one of the most outstanding inventions of mankind is the car! Almost immediately, people realized the value of cars and today it is impossible to imagine life without them. But along with this, cars, in addition to significant advantages, require quite a lot of expenses for operation, maintenance and repair. The main expenses are:

1. Fuel consumption taking into account the average mileage;
2. Maintenance, taking into account its periodicity and, accordingly, the individual mode of operation;
3. Consumable parts and materials, the cost of which is not included in the cost of maintenance and repair.

Yes, road transport is a major consumer of material resources. Can it be made cheaper? How to avoid rising costs for the maintenance and service of the car? Let's try to answer these questions.

For the rational use of fuel, their quality is of great importance. With a low quality of fuel, their consumption inevitably increases and the performance of the car worsens. Fuel consumption is also affected by the correct organization of transportation, that is, the degree of use of the vehicle's carrying capacity, which is determined by the

coefficient Y - the ratio of the mass of the transported cargo to the vehicle's carrying capacity. With an increase in Y, the fuel consumption per unit of transport work decreases: an increase in Y by 1% reduces the specific fuel consumption by 1.6%. At Y = 1, the fuel consumption will be minimal.

Fuel consumption per unit of transport work can be reduced by increasing the mileage utilization factor P:

$$P = \frac{P_{rp}}{P_{op}}$$

Where R<sub>gr</sub> is the mileage of a car with a load; R<sub>op</sub> - the total mileage of the car.

An increase in the coefficient P by 1% reduces the specific fuel consumption by 1.3%.

When trailers are used, the specific fuel consumption is reduced by 25-30%.

The use of fuel and lubricants without taking into account the design features of the engine inevitably leads to their overrun. This primarily applies to such indicators of fuel quality as the octane number and fractional composition for gasoline, cetane number and fractional composition for diesel fuels. Thus, operation on gasoline with a heavy fractional composition can increase fuel consumption by up to 70% and increase engine wear by 30-40%.

The use of inappropriate grades of oils leads to an excessive consumption of not only oil, but also fuel: engine oil with a high viscosity leads to an excessive consumption of fuel, with a low viscosity - to an excessive consumption of the oil itself.

The use of fuel and oil that do not correspond to the climatic conditions of the vehicle operation also leads to excessive consumption of fuel and lubricants. For example, the operation of a truck in winter on summer grades of fuel. Gasoline consumption when driving outside the city on a paved road increases by 3-6%, while driving in urban conditions - by 8-12%.

Also, the technical condition and quality of regulation of the units and mechanisms of cars has a huge role in fuel economy. Wear parts increase fuel consumption to a lesser extent than poor-quality adjustment. Thus, the wear of the cylinder-piston group to the point where exhaust gases begin to actively escape from the oil filler neck leads to an increase in fuel consumption by 10-12%, and violation of adjustments by 20-25%. In table. 1 shows the malfunctions of some parts and assemblies that affect the consumption of fuel and lubricants

Table 1. Faults affecting fuel and lubricant consumption

Malfunction	Increase in FCM consumption, %	
	fuel	oil
Incorrect adjustment of the brake mechanisms and wheel hubs	10-20	30-50
Front wheel alignment incorrectly set	5-10	10-15
Reduced pressure in all tires by 0.05 MPa	4-5	4-5
Valves out of adjustment	5-8	15-20
Economizer defective	10-15	-
Increased throughput of the main carburetor jet by 10%	5-10	-
Clogged air filter or intake manifold	4-5	15-29
Clogged crankcase ventilation system	-	150-200
One spark plug does not work in an eight-cylinder engine	15-18	-
The same in the six-cylinder engine	25	-
One injector defective	25-39	-
Ignition set 5° later than best	6-8	-
The gap between the contacts of the breaker is incorrectly set	5-7	-
Reduced by 2 times the gap between the electrodes of the spark plugs	10-15	-
Raising the fuel level in the float chamber by 4 mm	10	-
Malfunction of the centrifugal automatic ignition advance	2-4	-
Clogging of the air jets of the main dosing system of the carburetor with a decrease in throughput by 7%	2-4	-

An important factor is the qualification of the driver.

The professionalism of the driver is:

- In the correct assessment of road conditions;
- Maximum use of economical modes of operation;
- In the use of coasting;
- In timely gear shifting;
- In preference to driving in top gear.

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Depending on the driving technique, fuel consumption can vary by 20-25%. Frequent braking increases fuel consumption, since each time you have to force the engine for the next acceleration, therefore, steady-state driving is preferable. It is important to maintain the normal thermal regime of the engine, since both overheating and hypothermia of the engine lead to excessive fuel consumption.

High speeds of movement, of course, cause increased fuel consumption, since in this case it is necessary to overcome air resistance, which increases in proportion to the speed of movement. At a truck speed of 70 km/h, the traction force on the drive wheels is ten times greater than at a speed of 30 km/h to overcome air resistance, and in order to increase the traction force, additional fuel must be spent.

An empty car roof rack increases fuel consumption by 3-4%. Fuel consumption increases even more when driving with the windows open.

To reduce the cost of car maintenance during operation, very elementary but simple rules should be followed.

Tire pressure - again, fuel consumption and tire life depend on this parameter (a decrease in pressure leads to an increase in fuel consumption, when pumping, there is an increase in loads on shock absorbers and wear of tires and brake mechanisms).

In order to avoid this, it is only necessary to regularly check the tire pressures and maintain the pressures within the limits indicated in the vehicle's operating manual.

The choice of original consumables and spare parts also plays an important role in reducing costs. Original consumables and spare parts are parts produced on the assembly line of the automaker. Which cost even more than analogues, but their installation prevents unforeseen problems with the machine.

It is also very important to take into account that the resource of a car depends not only on the timely replacement of those fluids and the quality of the fuel, but also on the driving style, in other words, on the skill of the driver. Sharp acceleration and hard braking, intense slippage, pressing the accelerator pedal into the floor has a great impact on the working units of the car. Studies have shown that this driving style increases fuel consumption by 33%.

Based on the foregoing, we can conclude that in order to save resources during the operation and maintenance of the car, it is necessary to strictly observe the frequency and scope of maintenance recommended by the manufacturer, use highly qualified specialists during maintenance, as well as original consumables and spare parts. A special role in saving resources is given to the driver, a lot depends on his driving skills, the feeling of the car!

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