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STUDY AND IMPROVE THE PROPERTIES OF FUELS AND LUBRICANTS.

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Annotation: The most complete picture of the efficiency of fuel use in road transport is provided by the specific fuel consumption per unit of transport work or the carriage of one passenger.
Keywords: consumption of petroleum products, gasoline engines, taxi transportation, fuel economy.

Introduction: The structures of the car park of the Republic of Uzbekistan and industrialized countries differ significantly. The share of trucks and buses in the structure of our vehicle fleet is several times higher than in the United States. Therefore, improving fuel efficiency is, first of all, of great importance for trucks, the share of which in the energy balance of the industry and the share of fuel consumed by them is significant.

Automobile transport is one of the most energy-intensive sectors of the national economy. It accounts for 7.2% of the country's energy resources or 24.6% of liquid fuel of petroleum origin, and in the near future the relative consumption of petroleum products in road transport will increase even more.

The most complete picture of the efficiency of fuel use in road transport is provided by the specific fuel consumption per unit of transport work or the carriage of one passenger. The average specific fuel consumption per unit of transport work for all types of freight transportation by cars with gasoline engines in public transport today is 85 g / t km, and with diesel engines 44 g / t km. Specific fuel consumption for passenger transportation for buses with gasoline engines reached 14.7 g / pass пkm, and for diesel engines 10.8 g / pass km; for taxi transportation - 135 g / pass km.

In 1972, the consumption of liquid fuel in this country was 17.8% of total consumption (of which gasoline engines accounted for 11.5%, and diesel engines - 6.3%); in 1980 this figure decreased to 11.6 ... 13.0%, and the share of gasoline consumption was 7.2 ... 8.1%, and diesel fuel 4.4 ... 4.9%. The use of fuel by gasoline engines in 1985 decreased to 6.3 ... 7.5%, and by diesel engines - to 3.8 ... 1.5%.

A significant source of fuel economy is the fullest possible use of the power of the car, the rational organization of the operation of road transport, which transports more than 80% of agricultural cargo. Much depends on the experience of the drivers. Under the same conditions, highly qualified drivers consume 20 ... 30% less fuel. You need to move the car from a place smoothly, with a low fuel supply, without lingering in intermediate gears. Do not use the choke when the engine is warm. It is necessary to correctly use the car roll, provided that the traffic safety is ensured.

The vehicle should be running at its highest load without idle travel. The use of trailers and road trains is progressive: the consumption of gasoline per 1 t km is reduced by 25….30%. The efficiency of using machines in bulk transportation of goods (flour, grain, fertilizers, pesticides,

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etc.) by specialized vehicles is significantly increased. Of great importance is the choice of machines, their preparation for the transport of certain materials, drawing up a traffic plan, ensuring coordinated work with combines, timely maintenance, and the wide dissemination of the experience of leading drivers.

If the fuel contains abrasive mechanical impurities, then the consumption of gasoline increases sharply, and the service life of the fuel supply equipment, depending on the contamination, is reduced by 2 ... 3 times. Mechanical impurities penetrate into the gaps between the piston rings and the cylinder liner, causing their increased wear. An increase in the wear rate leads to a drop in power, a deterioration in efficiency, and premature engine failure.
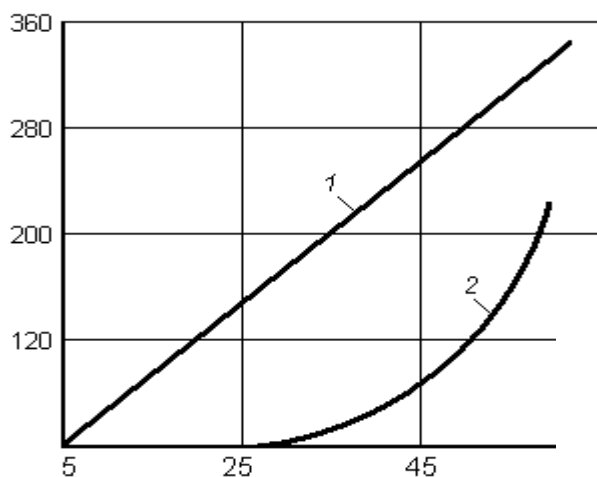

Figure: 1. Influence of resin conte *on the intensity of sediment accumulation:*

1 - in the intake manifold; 2 - on t} suction valve.

Resin-forming compounds are variou₋ unstable compounds, for example, unsaturated hydrocarbons, which over time, from elevated temperatures, the amount of oxygen in the air and from other factors, oxidize, polymerize, condense and turn into resins. Their number depends on the

chemical composition of raw materials, methods of processing and the quality of purification. Gasolines, which contain a large number of cracking products with a high content of unsaturated hydrocarbons, are not stable enough. The worse the conditions for the transportation and storage of gasoline, the more tar is formed. With an increase in the content of resins and resin-forming substances, the completeness of gasoline combustion worsens, and its detonation resistance decreases. Acids accumulating together with resins increase the corrosiveness of the fuel.

The main influence on the accumulation of resins is exerted by the storage temperature (Table 1.). In addition, the filling degree of the container is essential. So, for motor gasoline, which was stored for 6 months in a full (93% filling) barrel, the actual resin content increased 4 times, and when filled with 50% - 12 times. The presence in containers of old oxidation products, water, mechanical impurities, scale intensifies the processes of oxidation and accumulation of resins.
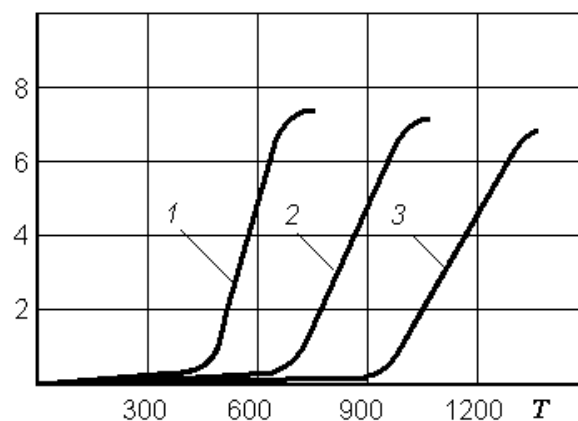

Figure: 2. Influence of the duration of the induction period on the content of resin-forming compounds depending on the octane number of gasoline:

1 - low-octane (A-72); 2 - high-octane (AI-93); 3 - Premium.

In some cases, to increase stability, a very small amount (thousandths, hundredths of a percent) of stabilizers (antioxidants) is introduced into the fuel: wood resin, oxydiphenylamine, etc., which inhibit the oxidation process, thereby increasing the induction period.

The strongest corrosive effect is exerted by active sulfur compounds, mineral acids and alkalis, and also water. All these substances are not allowed in gasoline. The presence of active sulfur compounds is determined by testing on a copper plate, and water-soluble acids and alkalis by checking the reaction of the aqueous extract, which must be neutral.

Table 1.

Change in tar content (mg / 100 ml) in gasoline during storage

Petrol	Initial resin content	After one month storage at a temperature, ^0C		After 10 months of storage at a temperature of 15 ... 20 ^0C	
		15...20	40…45	In the dark	in the light
Automotive direct distillation	4,0	6,0	396,0	16,0	44,0
Automotive catalytic cracking	7,5	14,0	558,0	53,4	76,0
Aviation	2,0	2,0	54,0	14,0	38,8

Diesel fuel is a complex mixture of paraffinic (10 ... 40%), naphthenic (20 ... 60%) and aromatic (14 ... 30%) hydrocarbons and their derivatives with an average molecular weight of 110 ... 230, boiling off in within 170 ... 380 ^0C Flash point is 35 ... 80 ^0C, solidification - below -5 ^0C. Solubility of water in fuel is about $9*10^{-5}$ kg / kg, oxygen - $(3.3 ... 3.5)*10^{-6}$ m^3 / kg

Diesel refractive index - 1,37...1,58;

surface tension coefficient - $(30...31)·10^{-3}$;

relative dielectric constant - 1,80...2,10;

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