THE ROLE OF COOLING LIQUIDS IN IMPROVING THE COOLING SYSTEM

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Annotation: This article highlights the importance of refrigeration in automobiles. Cooling plays an important role in controlling the engine's performance, maintaining its temperature, and reliability. Their composition, properties of hot water, and environmentally friendly analysis. , advanced lighting for use in vehicles with modern refrigeration based on cargo. Advanced systems extend engine lifespan.

Keywords: waste, car, environment, transport, engine, urban transport, gas, greenhouse effect, heavy metals, poisoning, ozone layer, decay, economic damage.

Annotatsiya. Ushbu maqola avtoservis korxonalarida ishlab chiqarish texnik bazasini takomillashtirish masalasiga bag‘ishlangan. Maqolada avtoservis korxonalarining ishlab chiqarish texnik bazasining tarkibi, uning samarali ishlashiga ta’sir qiluvchi omillar, shuningdek, texnologik jarayonlarni yaxshilash uchun zarur bo‘lgan zamonaviy texnikaviy yangilanishlar tahlil qilinadi. Avtoservis korxonalarida texnik bazaning takomillashtirilishi, servis jarayonlarini avtomatlashtirish, ishchi kuchining samaradorligini oshirish va xizmat ko‘rsatish sifatini yaxshilashda muhim o‘rin tutadi.

Kalit so‘zlar: modernizatsiya, avtomatlashtirish, texnik jihozlar, xizmat ko‘rsatish samaradorligi, innovatsiyalar.

Аннотация. Данная статья посвящена вопросу совершенствования производственно-технической базы на предприятиях автосервиса. В статье анализируется состав производственно-технической базы автосервисных предприятий, факторы, влияющие на ее эффективную работу, а также современные технические обновления, необходимые для улучшения технологических процессов. Совершенствование технической базы на предприятиях автосервиса играет важную роль в автоматизации сервисных процессов, повышении эффективности рабочей силы и улучшении качества обслуживания.

Ключевые слова: модернизация, автоматизация, техническое оснащение, эффективность обслуживания, инновации.

Introduction.

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In recent years, a number of measures have been taken to improve the quality of services provided to the population in the field of road transport, and targeted tasks for the development of road transport services are being consistently implemented. Among them are numerous resolutions and decrees, as well as a number of instructions on the development of national motor transport. A number of resolutions and decrees on the further development and implementation of this direction are confirmed by the changes taking place today. In this regard, by the Decree of the President of the Republic of Uzbekistan dated February 1, 2019 No. UP-5647 "On Measures for the Fundamental Improvement of the State Management System in the Field of Transport," the Ministry of Transport of the Republic of Uzbekistan was created on the basis of the Uzbek Agency for Road Transport.

Today, the world's largest automakers are striving to improve the cooling system of their cars year after year. For example, the world's largest manufacturers include Volvo, Audi, Chevrolet, Daimler-Benz, Iveco, MAN, Opel, Citroen, Ssania, Fiat, Volkswagen, Ford, Honda, and Toyota. In Uzbekistan, the demand for improving the refrigeration system of our national car manufacturer JSC "UzAuto Ichki yonuv dvigatelis" LLC "UzERAE Climate Control," which supplies parts used in the car cooling system, is growing year by year.

As a result of the implementation of such reforms in many spheres in our country, along with qualitative changes in the economy, processes of socio-economic development, liberalization of the economy, and further deepening of these reforms are taking place.

The next long-term priority, which is of decisive importance in increasing the potential, power, and competitiveness of our country's economy, is the implementation of an active investment policy for the implementation of strategically important projects aimed at modernizing, technically and technologically upgrading key leading industries, and developing transport and infrastructure communications [1].

Now, a comparative study of the components of various sectors of our national economy with the world market is of great importance. The national economy of Uzbekistan is the totality of all spheres, associations, enterprises, and organizations, which are united into an economic system based on common laws and development goals.

In the current socio-economic and political development of our republic, one of the most important directions of the development of the automotive industry and the transport system, as well as the transport infrastructure, is the development of

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the automotive industry, while the second most important task is the improvement of the engine cooling system for these vehicles in the near future [2].

Methodology. Function and importance of the internal combustion engine cooling system. For better use of thermal energy in a car's internal combustion engine, the temperature of its cylinders, combustion chamber, pistons, and other parts must be at the most favorable level (maintaining a normal thermal regime).

If the internal combustion engine is overheated, less combustible mixture (or air) enters the cylinders, the oil liquefies and its viscosity decreases, the mixture burns without a spark, and the internal combustion engine parts expand excessively and become stuck. If the internal combustion engine is overcooled, the viscosity of the oil increases, a high-quality combustible mixture is not formed, and the mixture does not burn completely, the fuel partially drips into the crankcase, which liquefies the oil. In both cases, the internal combustion engine parts wear out quickly, the power decreases, and the specific fuel consumption increases[3].

The cooling system consists of mechanisms and instruments for cooling internal combustion engine parts, and modern internal combustion engines are cooled by air or water.

Result and discussion. When cooling an internal combustion engine with air, each cylinder is made separately, and the cylinder and head walls are ribbed. The cylinders are cooled by a stream of air hitting during the movement of the machine (motorcycles) or, more often, by a stream of air created by a fan.

An air-cooled internal combustion engine does not have a radiator, water holders, or water pipes, therefore it is compact and simple in design, easy to maintain. The internal combustion engine heats up upon starting, therefore it wears less, the temperature of the air has little effect on the operation of the internal combustion engine, but more power is consumed to drive the fan.

Automobile internal combustion engines are mainly cooled with liquid. In this case, the walls of the cylinder and head are doubled, and cooling fluid circulates in the cavity formed between them (liquid jacket). When the internal combustion engine is cooled with liquid, the parts do not overheat. A small gap can be left between the cylinder and the piston, which reduces oil consumption. Due to the fact that the liquid layer isolates noise, the noise of the internal combustion engine is heard less. A liquid cooling system, depending on the method of liquid circulation, is subdivided into thermosiphon and forced circulation systems [4].

One of the most common cooling fluids is ordinary water, especially soft water, distilled or deionized water. The advantages of water as a coolant are, in particular, its characteristic high heat capacity, low viscosity, high liquidity, wide

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distribution in nature, and low cost. However, water is corrosive to many metals (more precisely, water itself does not cause corrosion, but impurities in it, an electrochemically weak electrolyte, cause corrosion), and also has the property of freezing. On cold winter days, when the temperature drops below zero, the water can freeze, which can cause serious damage to the engine, pipes, and radiator. Therefore, today there is a need to use a coolant other than water in cars running on an internal combustion engine. These are antifreeze or tasol.

Coolants such as antifreeze or tasol are familiar to many car owners. These liquids are presented on the world market in various forms - ready-to-use compositions or concentrates. Before pouring, the concentrate is diluted with water in the ratio recommended by the manufacturer.

Antifreezes are often called automotive cooling water, the freezing point of which is lower than the freezing point of the water (according to GOST, "low-temperature freezing cooling water"). The main function of modern coolants is the utilization of excess heat generated by the engine during the combustion of the fuel mixture. Additional functions of the antifreeze are to prevent damage to engine parts (prevention of elastomer separation, cavitation, and corrosion) and ensure the normal operation of the cooling system in winter conditions. Antifreezes have not only a low freezing point (more precisely, the point where the crystalline phase begins to settle), but also a significantly lower coefficient of expansion during freezing. Thus, if water increases its volume by 9% when frozen, then 25% ethylene glycol and 75% aqueous solution - 3.5% and 40% ethylene glycol and 60% aqueous solution - only 1.5%, which is safe for practically any structural materials.

Antifreezes consist more of a mixture of ethylene glycol (less often - propylene glycol, unlike ethylene glycol, not toxic, but more expensive), as well as a set of additives, additives, anti-anti-freeze anti-corrosion (corrosion inhibitors), anti-cavitation, anti-foaming, and fluorescent (to facilitate the search for fluid flowing from the damaged area) properties. Interestingly, pure ethylene glycol has a relatively high freezing point (-12.3°C), but when mixed with water, it forms a eutectic with a much lower freezing point than individual parts of the mixture - 75°C (for a mixture of 25% water and 75% ethylene glycol). With both more and less water, the freezing point of the mixture will be higher. In practice, the freezing point is set to the desired value by diluting the mixture with water as a cheaper component, so most commercial antifreezes contain more than 25% water (usually from 35 to 50%). Thus, a mixture with a water content of 35% begins to crystallize at approximately -65°C, and 50% at -40°C.

The first antifreezes appeared at the beginning of the 20th century and were made on the basis of methanol (methyl alcohol) or ethanol (ethyl alcohol) mixed

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with water. The toxicity of methanol and the psychoactive properties of ethanol, the low boiling point (65-82°C), and the volatility of monohydric alcohols (which was a major problem in non-hermetic cooling systems of those years). The high volatility of the alcohol, the need for frequent refilling of the liquid, and the high flammability of the alcohol were a major problem. Their increased corrosive effect on a number of metals and alloys significantly narrowed the possibilities of their use.

Products with the trademark "Tosol" were developed by the Moscow Research Institute of Organic Chemistry and Technology, consisting of the abbreviation "TOS" - "Technology of Organic Synthesis" (name of the department of the institute directly involved) and the ending "-ol" is used in chemical nomenclature to denote alcohols (ethanol, methanol, etc.), since the first of these liquids was based on dihydric ethylene glycol.

Of course, the most famous of all products with this mark was developed in the late 1960s and early 1970s to replace the Italian Paraflu antifreeze, which was originally used in Italy, from the cooling systems of VAZ cars. "Tosol-A" and "Tosol-AM" were low-temperature freezing refrigerants. This water mixture contained ethylene glycol, anti-corrosion and anti-foam additives. The second is designed to prevent the antifreeze from foaming during filling, preventing it from quickly filling the cooling systems of cars moving along the conveyor (according to the Italian technology used in VAZ, the cars are fully filled to the consumer with all technical fluids). Aleksey Vasilyevich Borisov and Oskar Naumovich Dyment were the developers of the antifreeze formula, Evgeny Borisovich Chizhov and Mark Petrovich Shatalov were the creators of the production technology and organizers of production. The authors of the trade name are Boris Vladimirovich Kiryan and Evgeny Borisovich Chizhov. Corrosion tests were conducted by Yuri Vladimirovich Tikhonov.

"Tosol-A" became the first low-freezing refrigerant designed for year-round vehicle operation in the XIX century. The previously used yellow-orange ethylene glycol antifreeze according to GOST 159-52, in which dextrin was an anti-corrosion additive, had relatively low indicators due to its outdated formula, and therefore it is recommended to use it only in the winter season. In winter and the warm season, the cooling system is usually filled with water. After the advent of the basin, it began to be used mainly in truck engines. Refrigerators "Tosol-A" and "Tosol-AM" ("A"-"car," "M"-modernized") are produced in three versions: a green concentrate with 96% ethylene glycol content, ready-made. For the use of coolant "Tosol-A40"/"AM40" (blue, 53%) and "Tosol-A65"/"AM65" (red, 63%), differing in the initial crystallization temperature (marked -40 or -65°C). Concentrate and

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cooling water with a crystallization temperature of -65°C, intended for the operation of equipment in polar conditions, are practically unavailable for retail sale. Tosol-AM is an option with an improved formula and extended service life (three years or 60,000 km instead of two years for Tosol-A).

In conclusion, based on the results of the conducted theoretical research, the following conclusions can be drawn:

1. The importance and function of the cooling system of passenger cars shows that it is one of the main systems for the internal combustion engine. It should be noted that defects in these systems have a significant impact on engine performance.

2. Antifreeze and taosol, which are currently used as cooling fluids, have shown significantly greater effectiveness compared to previously used water. Because the efficiency of air-cooled internal combustion engines is lower than that of liquid-cooled systems, many car manufacturers rely on liquid-cooled systems. This, in turn, means that the liquid cooling system is currently the most efficient.

3. In the improvement of parts in the internal combustion engine cooling system, the radiator occupies a special place in terms of price and quality indicators. The economical and technical convenience of improving radiators due to their relatively inexpensive materials and ease of operation can be seen from numerous experiments and the evolutionary history of radiator improvement.

4. The environment is now of great importance not only for humanity, but also for one of its greatest inventions - cars. Studying it will be necessary to extend the service life of cars and ensure their safe use during operation.

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