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Organization of Daily Maintenance and Diagnostics of Vehicles

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Annotation: *This work highlights the role of daily maintenance and diagnostics in ensuring the technical serviceability of vehicles and issues of their effective organization. Safe and reliable operation of vehicles directly depends on monitoring their daily technical condition, and such maintenance work serves to assess the vehicle's operability, the condition of the main systems, and prevent malfunctions.*

The study examined the composition of daily maintenance, maintenance stages, equipment used, as well as automated diagnostic methods and their advantages. Technological solutions for rapid and accurate diagnostics using modern technical means are also analyzed.

Keywords: *Vehicle Maintenance, Daily Maintenance, Diagnostics, Maintenance, Troubleshooting, Vehicle, Maintenance, Organizational Solutions, Maintenance System, Reliability*

Introduction. For the reliable and stable operation of our car, daily maintenance and high-quality diagnostics are absolutely necessary. With the help of daily maintenance, it is possible to predict the condition of parts and units, their service life in diagnostic work, if damage and safety are increased on the roads.

Changes in the technical condition of engine mechanisms occur due to accidental or constantly acting causes occurring during the operation of mechanisms, as well as external conditions, i.e., storage and operating environments. Random causes include hidden defects and overloading of the structure beyond permissible limits, etc.

The main causes that constantly affect the technical condition of engine mechanisms include: wear, plastic deformation, fatigue wear, corrosion, physicochemical and temperature changes of parts and materials.

Wear. Wear occurs under the influence of friction, depending on the quality and material of the machined surfaces of the parts, the presence of lubricants, load, and thermal operating modes. Wear is the process of gradually changing the size of a part due to its deformation due to friction or the release of material from the friction surface. Wear is classified into mechanical, molecular-mechanical, and corrosion-mechanical types.

Mechanical wear, in turn, is divided into abrasive wear due to plastic deformation and wear due to the destruction of a brittle surface. Abrasive wear is the cutting of friction surfaces by hard particles. Such particles fall from the outside in the form of dust and sand between friction parts (for example, the coating of the brake drum and shoe), or onto lubricants in open friction joints (screw connections, spring bushing pins), accelerating their wear.

Wear due to plastic deformation occurs under the influence of a large load on the parts, as a result of which the surface of the antifriction material layer shifts in the direction of sliding. In this case, the part changes its size without changing its mass.

Molecular-mechanical (adhesive) wear occurs due to the molecular adhesion of materials of friction surfaces and is observed during the wear of mechanisms. This leads to the formation of grooves, clogging, and destruction of the mechanism. Molecular-mechanical wear, due to the occurrence of local

contact on the friction surfaces, leads to the rupture of the oil layer due to high loads and speeds on them, causing heating and welding of metal particles. With the subsequent movement of the surfaces relative to each other, the bonds are broken, as a result of which a groove appears on one surface, and a protrusion on the other, i.e., the metal transitions from one surface to another.

Corrosion-mechanical, mechanical wear occurs under the aggressive influence of the medium, under the influence of which an unstable oxide layer forms on the friction surfaces and is removed by mechanical friction, and the cleaned surface is oxidized again. Corrosion-mechanical wear is observed in parts of cylinder-piston groups with corrosion agents, in hydraulic boosters, in braking systems with hydraulic drives.

Plastic deformation and splitting. These occur when the yield strength of the viscous (steel) material reaches or exceeds the yield strength of the brittle (cast iron) material. In reality, such breakdowns or calculation errors occur due to violations of operating rules (overload, improper control, etc.).

Fatigue is decomposition. It is formed under the action of cyclic loads exceeding the endurance limit of the part material. Fatigue gradually leads to the accumulation and growth of cracks, causing fatigue destruction of the part at a certain number of loading cycles.

Rust (corrosion). Corrosion wear occurs due to the ruthless influence of the external environment on parts, leading to metal oxidation and a decrease in strength, as well as a deterioration in the appearance of the part and the entire product. The main components of corrosion-causing environments include salts sprayed on roads during winter, alkalis in water and soil, and toxic gases emitted by vehicles.

Physicochemical and temperature changes (aging) of parts. Vehicle units, parts, and operating materials change their technical condition under the influence of the external environment and operating conditions. That is, rubber-technical products lose their strength and elasticity as a result of oxidation, heat exposure (heating or cooling), chemical effects of oil, fuel and liquids, sun exposure and moisture. During vehicle operation, the technical and operational properties of lubricating oils and liquids change due to the accumulation of wear-resistant particles.

Technical diagnostics of the engine.

To increase the efficiency of vehicle engine maintenance and repair work, it is necessary to determine the technical condition of the engine before and after maintenance and repair. In this case, it is necessary to assess the technical condition of the mechanisms without disassembling them and without significant labor costs. Knowledge of hidden and impending failures, along with preventing early or late repair work, allows for quality control of completed work.

Technical diagnostics is a branch of knowledge that studies methods, equipment, and calculation methods for determining the technical condition of an engine without disassembly, as well as the technology and organization of diagnostic systems for vehicles during operation.

In technical diagnostics, the vehicle or parts (aggregates, mechanisms) are determined by comparing them with standard indicators, external characteristics, and technical condition indicators.

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