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Processing of Automobile Body Details

Adilov Okbuta Karimovich, Turaev Erkin Nematovich

Associate Professor, Jizzakh Polytechnic Institute, Uzbekistan

Senior Lecturer, Jizzakh Polytechnic Institute, Uzbekistan

ABSTRACT: The recommendations developed in this article are mainly aimed at improving the maintenance of vehicles during operation. Various defects occur during the operation of vehicles, the main reason for which are the factors affecting their operation.

I. INTRODUCTION

Various defects occur during the operation of vehicles, the main reason for which are the factors affecting their operation.

For this purpose, it is expedient to study the process of performing the functional function of the body. There are many ways to diagnose body parts, mainly taking into account the condition of the joints, corrosion, noise, the occurrence of knocking sounds, and the condition of the underside of the body. Table 1 below shows the diagnostic procedure for defects in body parts.

Table-1. Diagnostic procedure for defects

№	Diagnostic work	Degree of accuracy	Defects
1	Monitoring the status of body joints	-Vacancy -Assessment of general technical condition mobility	-erosion size (10%) - loosening of joints
2	Tracking of body parts	-General assessment of the lower part -Detection of existing faults at the bottom	-Movement of the protective layer -Occurrence of vibrations - Erosion of fastened details
3	Determining body properties	-Assess the technical condition of the knockout -Determine the parts where corrosion is present	-Provision of small information -Low level of accuracy of diagnostics -No assessment of the environment
4	Тебраниш хусусиятини аниқлаш	- Preliminary assessment of the technical condition of the body parts for noise	-Low level of accuracy of diagnostics -No assessment of the environment
5	Determination of corrosion tolerance	-Evaluation of the technical condition of the body on the technical characteristics	- High cost of processing -Availability of high workload -Provided with small information - Violation of the quality of technical specifications of parts

Reasons for changes in technical condition in the operating conditions:

- level of loading of details;
- relationship of details in relation to each other;
- physical and chemical changes in the materials of details;
- the influence of the external environment (solar radiation, temperature, humidity, wind speed, the amount of dust in the air, etc.);
- other reasons.

The structural parameters of objects are prone to shape and other changes over time, and as a result, wear, corrosion, fatigue distortions, plastic shape changes, temperature distortions, erosion, wear and other processes occur.



Table 2. List of violations of Damas and Isuzu cars operating in Jizzakh when traveling up to 100 thousand km

Т.р.№№	Causes of disorders	Rate of disorders, %	
		DAMAS	ISUZU
1.	Depletion	43,12	51,7
2.	Plastic deformation and erosion: -ripping, cutting off -stretching, bending, oppression	17,40 8,20 9,20	18,04 13,06 4,98
3.	Decay on fatigue: -cracking -fracture fracture -separation into layers	23,05 11,7 5,80 5,55	12,60 6, 10 2,5 4,00
4.	Decomposition in hot state: -Burning, -shortcircuit	10,81 5,49	5,69 5,31
5.	Other causes	5,62	5,46
Total		100,00	100,00

In-depth diagnostic methods of the elements have not been fully analyzed in many scientific sources. In this regard, in the course of this research, diagnostic analyzes on the elements of the body are covered.

The serviceability of vehicles varies under operating conditions, for example: if the current repair rate is 25% on a new car, it will increase to 225% before deregistration, it will increase 9 times.

During this period, the cost of spare parts will increase by 17 times, the coefficient of technical readiness of the car will decrease by 15%, the daily mileage will decrease by 45%, and so on.

Consumers are interested not only in the initial values of car performance, but also in the dynamics of its change and its ultimate values. In the process of operation, it is possible to use the system of rational maintenance and repair, production, training of workers and drivers, and other measures to control the working capacity of the car.

The main factors that predispose to corrosion of cars are the temperature, humidity and the presence of salts in the air. The majority of vehicles in the country are operated and stored in rural areas, in severe extreme conditions. In particular, mineral fertilizers, herbicides and defoliant used in agriculture cause more damage to the body and other parts of vehicles than to climatic conditions.

Environmental pollution leads to an increase in aggressive chemicals in the air, which in turn accelerates the corrosion process in cars. According to the world's metrological services, the atmosphere is increasingly polluted with sulfur dioxide (S₂O), which combines with moisture in the air to form sulfuric acid. The acid sits in the car parts in place, accelerating rust.

All exterior and interior parts of cars can corrode. Body parts are made of thin (0.5 ... 1.2 mm) steels and are protected only by a small thickness of primer, which, after 2 ... 2.5 years of operation, as a result of corrosion, some parts fail.

There are two ways to prevent vehicle corrosion.

The first includes corrosion prevention, and the second includes measures to protect against harmful environmental influences.

Of course, it is advisable to eliminate the causes of corrosion, but it can be done in part. Prevention of climatic influences is mainly achieved by well-organized storage of cars indoors. Reducing the effects of harmful substances is achieved by using harmless chemicals used in agriculture.

Correct selection of materials used in the design and manufacture of vehicles and positive design improvements can reduce corrosion. For example, car bodies are made of stainless galvanized steel. This method is used in the production of Ford (USA), Citroen (France), Daimler-Bents (GFR). At the same time, when designing body parts, it is necessary to minimize the "pocket" areas where various impurities and moisture accumulate, to use fuel oil products that are low in aggressive substances.



II. RESEARCH METHODOLOGY

In recent years, protection from harmful environmental influences during the operation and maintenance of vehicles is widely used. To protect the exterior of the cars, their surface is covered with a thin curtain of anti-corrosion material. For this purpose, the following materials are mainly used: plastic oil (PVK (GOST 19537-74), VTV-1 (TU 38181180-78), UNZ TU 38001277-76), mastic (№ 579, № 580, BMP-1, №4010) and canning oil is applied. The anti-corrosion curtain not only protects the details from rust, but also helps to reduce noise. It also serves to ensure safety while driving on the roads.

During the experimental study, changes (decreases) in pressure and temperature on the surface of the parts were observed as a result of corrosion of the body elements.

III. ANALYSIS AND RESULTS

For the experimental research process, MAN cars produced at the Samarkand Automobile Plant were tested at the Jizzakh MAN service. At the same time, the diagnostic device was studied and measured on the body elements. The technical characteristics of the car body parts were determined in working condition.

In view of the above, it is necessary to formulate the characteristics of the parts as follows: mainly the inability of the parts to perform their function depending on the degree of impact on performance leads to loss of performance characteristics.

It is necessary to take into account the amount of details that have a prophylactic effect on the reliability characteristics of vehicles. The amount of details that cause the fault, in turn, should be taken into account in the diagnostic system of the factors that cause the need for repair of vehicles. At this point, it is necessary to clarify the average distortion characteristic of a single detail in the unit. The average number of failures of a single part in the unit is determined as follows:

$$N_{o'} = \frac{N_d}{m} \quad (1)$$

Here, N_d - the number of disorders, m - list of replaceable parts.

When assessing the breakdown of aggregates and systems of MAN vehicles at a distance of 0-150 thousand km, the average number of breakdowns on the technical characteristics of the body parts was a sequence of permanent

$$N_{o'} = \frac{N_d}{m} = \frac{10}{7} = 1,4$$

breakdowns in 7 out of 10 breakdowns in MAN cars..

In accordance with the operating conditions in the operation of vehicles in the process of the experiment, based on the calculated results:

The same type of distortion was observed in $N = 1.4$ details in MAN car engines.

The ratio of parts that are prone to breakdown in the overall unit to the number of broken parts in average operation: $N_{detail} \geq N_{o'} \quad (2)$

Here: N_{detail} - the number of perishable parts.

Given that the parts in a complete unit require repair from a state of wear to a single failure, the amount (T_{detail}) (To') is greater than or equal to the average repair parts required to restore the working capacity of parts that require average repair to perform its functional function. At this point, the average amount of details required for repair is determined

$$T_{o'} = \frac{T_d}{N_d}; \text{work} * \text{hour} / \text{detail} \quad (3)$$

using the following formula:

Here: T_d - the amount of total costs per unit (N_{d} relative to the amount of total disturbances).

In this regard, the following requirements are required to be met:

$$T_{detail} \geq To' \quad (4)$$

In the process of maintenance and repair of the rolling stock should be provided a list of necessary details on the results of preventive technical diagnostics, these details are mainly used to restore the technical performance of vehicles in the technological process and achieve cost-effectiveness..

Due to the need for a theoretical assessment of the effectiveness of the results of the study, it is expedient to determine the cost-effectiveness of the technological process on the defect identified in the diagnostic process, taking into account the replacement of parts due to defects in the body.



At this end, it is necessary to assess the annual economic efficiency in accordance with the general methodology of the technical process.

$$\Theta = (Z_m \cdot Z_k) \cdot A_t \quad (5)$$

Here A-annual productivity of automobiles Tkm; Z_m, Z_k-The cost of the car, which is adapted to the traditional way of diagnostics to ensure the performance of the car and is presented in place, is determined using the following formula.

$$Z = S + E_q \cdot K \quad (6)$$

Here: S-shipping costso'm/tkm; E_q -normative coefficient of capital investment efficiency; K-specific capital investment in productionso'm/tkm.

Due to the fact that the research conducted here is mainly focused on the body, we determine the average diagnostic body cost of one body.

$$S_d = \sum_{i=1}^n C_i \cdot P_i \quad (7)$$

here: n-the number of parts to be restored or replaced; C_i-ith the cost of repairing or replacing a part; P_i – the probability of restoration or replacement of the ith detail.

IV. CONCLUSIONS AND SUGGESTIONS

The costs of the diagnostic process are determined directly using the labor volume T_d and the tariff rate X per worker involved in the process., бунда, T_d=83 work- hour, X=10427 s

Taking into account the operation of vehicles in difficult road conditions, the periodicity of the mileage before diagnostics (according to 2nd TS) is L_d = 14200 km, the annual mileage is L_y = 73000 km. Based on this normative indicator

the annual cost of diagnostics is determined as follows in relation to the cost of recognizing S_d of parts replaced during the year.

$$S_{yd} = \frac{L_y}{L_d} (a \cdot T_d + S_{di})s \quad (8)$$

Here: a is diagnostic exchange time a=6 hours.

In conclusion, it can be said that if the full technical diagnostics of the technical characteristics of vehicles during the period of operation is carried out during the period of maintenance, it will be possible to maintain the technical capacity of the body, which will reduce costs and achieve cost-effectiveness.

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