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TECHNICAL SCIENCE

Как видно из графика требуемые теплопоступления за счет нагрева внутреннего пространства помещений многоэтажного жилого дома у вариантов 2 и 3 меньше, чем у варианта 1 на 68 % и 67 % соответственно [6].

В результате моделирования энергоэффективности при различном решении теплозащитной оболочки многоэтажного жилого дома можно сделать вывод: варианты здания с ограждающими конструкциями, удовлетворяющие требованиям норм по тепловой защите [1,2] имеют как более комфортные для жизнедеятельности человека в соответствии с функциональным назначением здания, так и являются менее затратными по эксплуатационным расходам на отопление.

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ДОСЛІДЖЕННЯ КОНТРОЛЮ ЯКОСТІ ЗАПАСНИХ ЧАСТИН МОБІЛЬНОЇ ТЕХНІКИ

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RESEARCH OF QUALITY CONTROL OF SPARE PARTS OF MOBILE EQUIPMENT

Анотація.

Тривала експлуатація мобільних машин в основному залежить від технічного стану, який підтримується якісним технічним обслуговуванням та ремонтом. При використанні неякісної зношеної техніки збільшується потребу в запасних частинах, що негативно впливає на експлуатаційні витрати. Загострюється проблемами тим, що рівень браку запасних частин досягає 45%. При цьому, ресурс запасних частин не відповідає заданому, що призводить до збільшення експлуатаційних витрат.

На сьогоднішній день, забезпечення ринку якісними запасними частинами є найважливішим завданням, що в свою чергу підвищить довговічність машинних агрегатів.

В даній статті розглянуто питання показників якості запасних деталей, методів контролю параметрів якості. Проаналізовано кількість бракованих запасних частин машинобудівної продукції. Опрацьовані основні принципи управління якістю. Визначили якість запасних частин, що поставляються на дилерські підприємства та станції технічного обслуговування. Запропонована класифікація фізико-механічних властивостей матеріалу. Розглянуто наступні формули: визначення цільової функції відповідності фізико-механічним властивостям матеріалу науково-технічної документації; визначення функції якісного контролю фізико-механічних параметрів; визначення функції якісного контролю геометричних параметрів та ймовірність якісного контролю автоматизованим вимірювальним пристроєм і інші. А також продемонстровано можливі засоби контролю якості машинобудівних виробів.

За допомогою отриманої інформації, зроблені підсумки та проведений аналіз методик контролю якості запасних частин мобільних машин.

Abstract.

Long-term operation of mobile machines mainly depends on the technical condition, which is supported by quality maintenance and repair. When using low-quality worn-out equipment, the need for spare parts increases, which negatively affects operating costs. The problem is exacerbated by the fact that the level of shortage of spare parts reaches 45%. At the same time, the resource of spare parts does not correspond to the set, which leads to an increase in operating costs.

Today, providing the market with quality spare parts is the most important task, which in turn will increase the durability of machinery.

This article considers the quality of spare parts, methods of quality control. The number of defective spare parts of machine-building products is analyzed. The basic principles of quality management are worked out. Determined the quality of spare parts supplied to dealerships and service stations. The classification of physical and mechanical properties of material is offered. The following formulas are considered: determination of the target function of compliance with the physical and mechanical properties of the material of scientific and technical documentation; determination of the function of qualitative control of physical and mechanical parameters; determination of the function of quality control of geometric parameters and the probability of quality control by an automated measuring device and others. Also, possible means of quality control of machine-building products are demonstrated.

With the help of the received information, the results are made and the analysis of methods of quality control of spare parts of mobile machines is carried out.

Ключові слова: *мобільні машини, запасні деталі, техніка, якість, засоби контролю, методи контролю, сталь, випромінювання.*

Keywords: *mobile machines, spare parts, equipment, quality, means of control, methods of control, steel, radiation.*

Formulation of the problem. Now an important role in the automotive space is occupied by spare parts. Spare parts include: parts, assemblies, units used for repairs, replacement of worn parts of machines, vehicles and other types of equipment during their repairs, as well as car tires in stock and turnover

Spare parts are individual components, assemblies and parts of vehicles designed to replace worn-out parts of fixed assets.

At repair of mobile cars practically all basic assembly units of equipment refuse, but thus there are also such details which cannot be restored. Together with the problem of providing the domestic market with modern equipment, a serious problem is the low quality of spare parts. In recent years, low-quality spare parts, which is at least 40% of the total, are arriving at technical service enterprises. The resource of spare parts not only does not correspond to their cost, but also can lead to additional expenses for elimination of malfunctions at operation of cars. [1-3].

Spare parts for mobile machines do not always meet the established requirements. In the market of spare parts are up to 45% of shortages, which in turn negatively affects the further operation of equipment [1-3].

The main reasons for the failure of parts can be: low quality of manufacture and assembly, inconsistency of the brand of manufacture, non-compliance with the alignment of the holes, high intensity of operation, and others.

To solve this problem, it is necessary at the initial level of manufacture of mobile machines, to strengthen quality control of equipment and spare parts, and dealers and technical services - to organize quality control of the delivered products.

Determining the level of quality of mobile machines reveals the compliance of their characteristics with the established technical indicators.

With the help of standard mechanical means, control the main indicators of spare parts. The analysis shows that most of the purchased spare parts do not meet their technical requirements and have a number of defects.

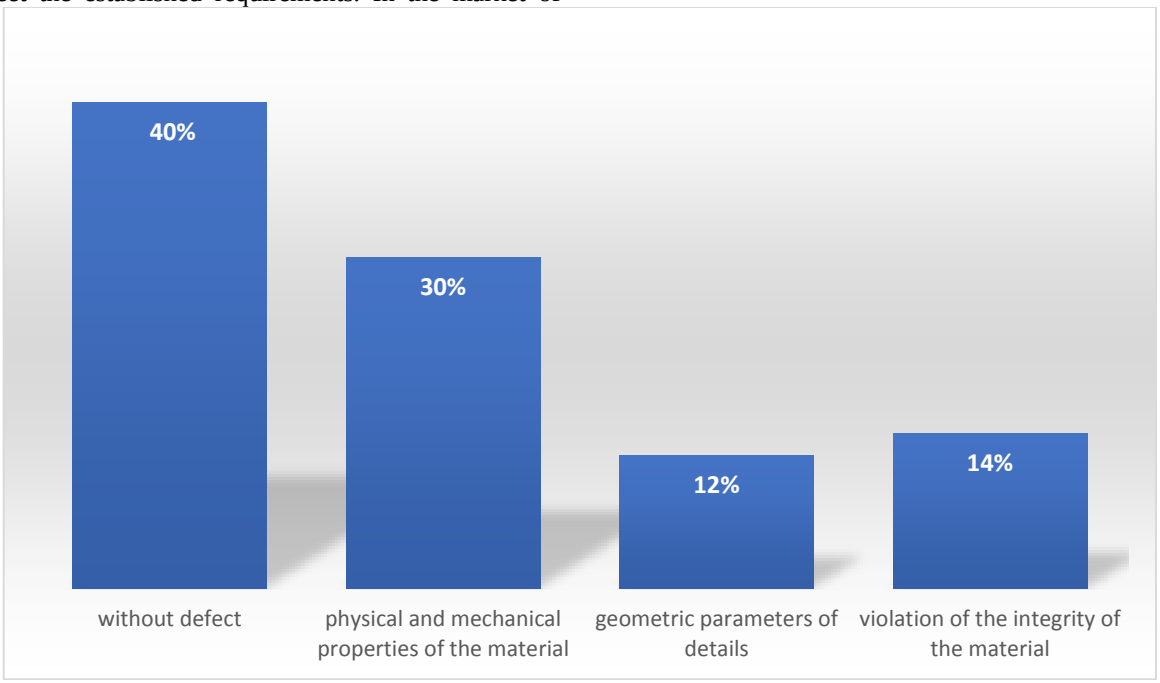


Fig. 1 - Structure of defects of spare parts.

Figure 1 shows that no defects were found in 44% of purchased spare parts. This indicates that the quality of spare parts is very low. Most of the detected defects (30%) are due to the mismatch of physical and mechanical parameters of the parts (steel grade, hardness, roughness, corrosion resistance).

Violation of such properties of the spare part is associated with the use of inappropriate materials in the manufacture in order to reduce the cost of production.

The quality of machine-building products is at a very low level, because about 56% of spare parts do not meet the technical requirements, and most defects are related to the physical and mechanical parameters of the part.

In this regard, the formation and organization of the process of quality control of machine-building products entering the market and dealerships, becomes necessary. At the enterprises of technical service it is necessary to organize quality control services on spare parts and to equip them with the modern control and measuring equipment which will allow to define defective detail in due time and to prevent its operation on mobile cars.

The purpose and objectives of the study. The purpose of this study is to improve the methods and means of quality control of spare parts to eliminate the ingress of low-quality parts in the process of repairing machines.

To achieve this goal you need to solve a number of key tasks:

✓ determine the quality of spare parts supplied to dealerships and service stations;

✓ substantiate methods and means of control of physical-mechanical and geometrical parameters of spare parts of mobile machines;

✓ taking into account the received information, to draw conclusions and to carry out the analysismethods of quality control of spare parts for mobile machines.

Quality as the main criterion of equipment reliability. Reliability is one of the main indicators of the quality of machines and their parts, and in particular spare parts. Reliability largely depends on the performance of their parts and joints, which are determined by the manufacturing technology.

The condition of the surface layers is the main criterion of reliability because the destruction begins with the outer surfaces. Requirements for their quality are constantly increasing as the modes of operation of parts.

Physico-mechanical and geometric parameters of the surface layer are characterized by a complex indicator of surface quality. The physical and mechanical parameters include: hardness; deformation hardening (slander); residual stresses

The main reasons that affect the wear of parts and the quality of spare parts include:

- quality of machining of parts;
- quality of metal;
- oil quality;
- speed of movement of the rubbing details and specific pressure on them;
- gaps between friction parts;
- operating conditions of machines.

During operation of details, certain requirements are shown to them: from loading, speed, temperature, character of friction and oil, to quality or cleanliness of a surface of a detail.

There is a great variety of definitions of "Quality". International standard ISO 9000: 2008 defines quality as the degree of compliance of a set of inherent characteristics with the requirements, while GOST 15467-79 - "Quality is a set of characteristics of the object related to its ability to meet the established and proposed needs" [4].

Thanks to an effective quality management system, high product quality is achieved. According to ISO 9000 international standards, a quality system is a set of organizational structure, methods, processes and resources required for overall quality management.

With the help of international ISO standards, product quality management systems are developed. The principles that are taken into account in the development of systems are shown in Figure 2.

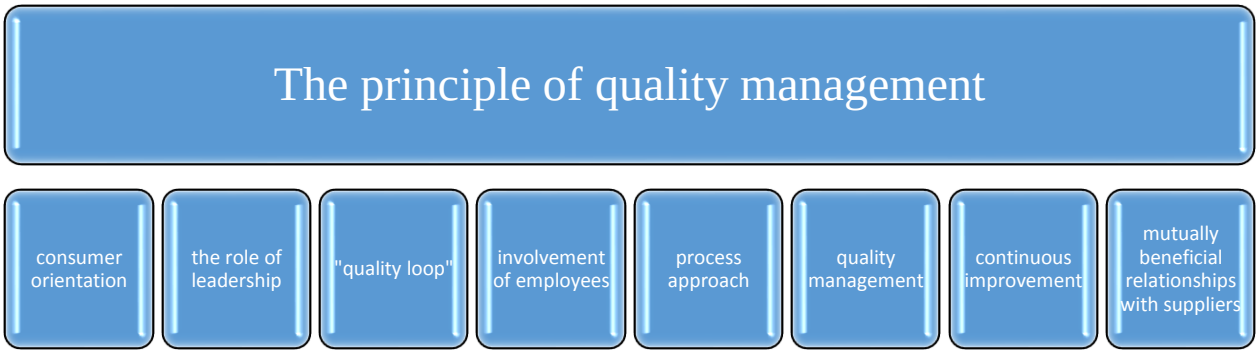


Fig. 2 - Basic principles of quality management.

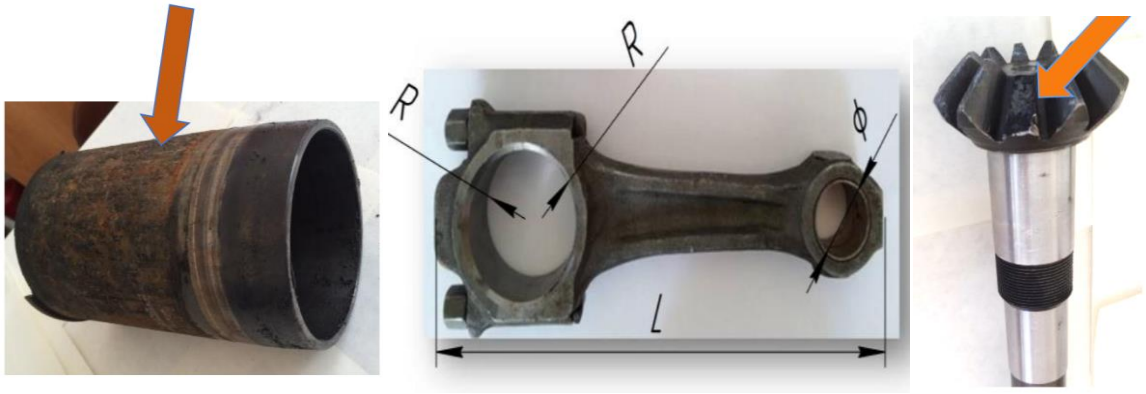
For the successful operation of the quality management system it is necessary to ensure the implementation of each of these principles.

Using contact and non-contact measurement methods control the physical and mechanical and geometric parameters of spare parts for mobile equipment [4].

Rangefinder, interference, triangulation, reflectometric, X-ray, laser-acoustic, spectral interferometry, moire, X-ray, pulsed, tomographic, ultrasonic, holographic and others, these methods are contactless quality control. The implementation of the above methods requires the availability of appropriate control and measuring devices, such as video cameras, optical

scanners, automatic measuring instruments and other optoelectronic measuring instruments.

The most common defects associated with the mismatch of physical and mechanical properties of the material, the mismatch of geometric parameters, as well as violation of the integrity of the material (Figure 3) [8].



a) *b)* *c)*

Fig. 3 - The main defects of the parts: a) defects associated with changes in the physical and mechanical properties of the material parts; b) defects associated with the mismatch of the geometric dimensions of the parts; c) defects associated with the violation of the integrity of the material of the parts.

Today, defective parts are made in accordance with the geometric parameters of the original, but to adhere to the materials used and production technology is impossible in terms of domestic production.

Often manufacturers do not have the legal right to reproduce spare parts, such products have inappropriate markings, they are not of sufficient quality. In this situation, the question arises in the need for quality control not only original but also non-original and restored parts designed for both foreign and domestic equipment.

Quality control systems. One of the most important areas in the technical renewal of mobile machines is: timely supply of quality spare parts, which can be implemented through highly efficient organization of incoming quality control at the enterprises of technical service.

Incoming quality control of spare parts pursues the main ultimate goal - to increase the readiness of mobile equipment.

Conditions (factors) to ensure the implementation of the necessary technological operations determine the parameters of the quality control process.

There are four groups of factors that affect the effectiveness of quality control:

- financial resources (sources of funding);
- labor resources (provision of qualified specialists);
- material and technical resources (availability of regulatory and technical documentation and technological equipment);
- social resources (education, health care, social security, etc.).

At present, it is advisable to organize a post of incoming quality control of spare parts. This mechanism will be especially important for 40% of customer complaints about the quality of maintenance and repair of equipment associated with low quality spare parts or materials. Paying attention to the fact that spare parts come to the consumer in small batches, it is advisable to introduce continuous quality control, rather than selective. In addition, the control of input parts will be effective only if all incoming spare parts coming through the service will pass through it.

Statistics have shown that the main defects that result in the selection of defective spare parts are non-compliance with the physical and mechanical properties of the material and non-compliance with their geometric dimensions.

Determining the reasons for the discrepancy between the physical and mechanical properties of spare parts of the regulatory documentation allowed to identify the following main reasons: non-compliance with manufacturing technology, savings on material quality, low accuracy of measurements in quality assessment.

By means of quality control system of definition of physical and mechanical properties, spare parts, allows to reveal defects at once and to prevent hit of such details in operation (fig. 4). Classification of physical and mechanical properties of the material is presented in table 1 [6-7].

a) b) c)

Fig. 4 - Types of controlled spare parts: a) half-axle; b) shaft; c) gear.

The objective function of compliance with the physical and mechanical properties of the material of scientific and technical documentation will have the expression:

$$P_f = f\left(P_h, P_{тв}, P_d, P_\psi, P_1, P_{об}, P_r, P_i, P_p, P_t\right) \to 1 \quad (1)$$
$$\text{at} З_{tot.} \to optim, \Delta_f \to min.$$

where P_h is the probability of compliance with the chemical composition of the material; $P_{тв}$ - the probability of compliance with the hardness of the controlled product; P_d - the probability of providing the required strength and deformation properties of the NTD material; P_ψ - level of impact strength; P_1 - compliance with thermal conductivity and linear expansion of the material; $P_{об}$ - method of production and processing of material; P_r - the presence of corrosion resistance; P_i - the presence of wear resistance; P_p - correspondence of material density P_t - correspondence of melting temperature of material; $З_{сум}$ - total costs for the organization and control of physical and mechanical parameters of spare parts; Δ_f - measurement error.

Table 1.

Classification of physical and mechanical properties of the material

№	Physico-mechanical properties of the material	An outstanding parameter
1	Chemical composition, P_h	The content of chemicals
2	Surface hardness, $P_{тв}$	Static, dynamic, kinetic
3	Impact strength, P_ψ	Shock load, bending
4	Corrosion resistance, P_r	Corrosion rate
5	Thermal conductivity and linear expansion, P_1	Coefficient of linear expansion and thermal conductivity
6	Method of production and processing, $P_{об}$	Changing the shape, size and qualities of metals and alloys
7	Density, P_p	Weight and volume of the part
8	Durability, P_i	Wear resistance under certain conditions of friction
9	Melting point, P_t	Melting point
10	Strength characteristics and deformation propertiesP_d	Destructive tensile, compressive and bending stress
		Tensile and flexural modulus

Quite often unscrupulous manufacturers use ST2 steel to replace high-quality alloy steel in order to reduce the cost of production. Thus, the control of physical and mechanical properties of the material allows to detect inconsistencies in the chemical composition of the material, hardness, corrosion resistance and other parameters, which can adversely affect the operation of the spare part and the whole machine.

With the help of steel grade, part and chemical content, it is possible to determine where in the part there are inconsistencies as a result of which microcracks can be formed.

Manufacturing technology, chemical composition and structure characterize the material of spare parts.

After control of physical and mechanical properties of spare parts of mobile machines and their sorting, high-quality spare parts are sent for control of geometrical parameters.

Non-compliance with geometric parameters is the next most important group of defects. Occurrence of such defects can be connected both with non-observance of technological process of manufacturing, and with damage of technological means of preparation (machines) of manufacturing plants.

Control of geometrical parameters of spare parts, mobile machines, is an important stage in the process of quality assessment.

The function of quality control of physical and mechanical parameters will be as follows:

$$\Phi_{ПМ} = f(M, Q, M_{CT}) \quad (2)$$

where M is the probability of weight control of the spare part; Q is the probability of determining the chemical composition of the spare part; M_{CT} - probability of control of steel grade of spare part.

The function of quality control of geometric parameters is equal to:

$$\Gamma_П = f(D_r, H_ш) \quad (3)$$

where D_r is the probability of controlling the linear dimensions; $H_ш$ - the probability of controlling the alignment, flatness, barrel.

The probability of quality control by an automated measuring device will be determined as:

$$N_{АВП} = \Phi_{ПМ} \cdot \Gamma_{П} \quad (4)$$

When using optoelectric measuring instruments, the process of quality control of spare parts is influenced by many different factors that distort their readings. It all depends on the conditions of control, the methods and means of control used. To correct these factors, it is necessary to determine the degree and nature of their impact, to develop corrective dependencies and recommendations for various spare parts for mobile machines.

Factors influencing the results of control by an automated measuring device can be divided into groups: parameters of controlled devices, properties of the controlled spare part, technological and other factors [4, 7].

After analyzing the scientific work and the results of theoretical studies of the influence of factors on the accuracy of optoelectronic, automated means of control allowed to determine the main values of errors of triangulation measuring devices [7].

Previously obtained dependences of measurement accuracy on factors due to the parameters of control and measuring equipment and properties of controlled spare parts, allow to estimate the obtained measurement errors and choose the optimal value of parameters, it allows to continue theoretical research of other factors affecting accuracy and performance of contactless devices.

The automated measuring device includes certain methods and means of control, so a group of factors of the parameters of controlled devices will significantly affect each measuring instrument to a different degree. In this regard, it is necessary to develop a method of influencing all factors, both individually and in total, and provide recommendations for reducing the impact of factors on the accuracy of control by an automated measuring device.

Devices with which to control the quality of machine-building products. Depending on the degree of mechanization and automation, there are manual, mechanized, automatic means of control [7].

A means of control that functions without the direct involvement of man is called an automatic means of control. A means of monitoring the technical condition, which operates with partial human participation, is called an automated means of control. Built-in means of control - a means of monitoring the technical condition, which is an integral part of the controlled product [6].

All mechanized and automated devices are divided into one-dimensional and multidimensional - depending on the number of controlled parameters of the parts.

Multidimensional devices are divided into complex and group. In complex devices at one position several parameters are controlled at the same time, in group devices only one parameter is controlled at each measuring position.

Measures, measuring transducers, measuring installations, measuring systems, measuring instruments - all this refers to the main types of measuring instruments.

By means of a measure reproduce physical size of the set size. Measures are unambiguous and ambiguous. Measures that reproduce physical quantities of the same size are called unambiguous. These include: weight, caliber, samples of hardness, roughness, and others. With the help of multi-valued measures, to reproduce a number of dimensions of a physical quantity, often even continuously fill some space between certain limits. These measures include: a millimeter ruler, a variometer and a variable capacitor.

A set of functionally integrated measuring instruments and auxiliary devices that are designed to generate signals of measuring information in a form convenient for direct perception by the observer and location in one place are called measuring installations.

Measuring transducers include measuring instruments that convert measuring information into a form convenient for further conversion, transmission, storage and processing, but generally not available for direct perception by the observer. Measuring transducers include: ammeters, voltmeters, manometers, thermocouples, measuring amplifiers, etc.

A set of measuring instruments and auxiliary devices interconnected by communication channels are called measuring systems. Communication channels are designed to generate signals of measuring information in the form of a convenient form for automatic processing of control systems.

Measuring instruments are measuring instruments that are designed to obtain measuring information about the quantity to be measured in a convenient form for perception by the observer.

To choose the means of measurement you need to consider the following: the volume of production of controlled parts, their design features, type of characteristic defects, method and speed of control, as well as the location of the controlled part.

Today, technical service companies are increasingly using contact controls to determine certain parameters.

Fig. 5 - Contact control and measuring instruments.

Despite the widespread use of measuring instruments based on contact measurement methods, they have a number of disadvantages:

- mechanical contact of measuring elements with the object of control is limited, both in terms of resolution and the degree of influence of measuring elements on the geometry of the product;
- have low measurement performance;
- low accuracy of measurements;
- poorly amenable to automation.

If we consider coordinate measuring machines, they are the most accurate contact devices with the possibility of automation. They are official measuring instruments according to ISO standards.

The main disadvantages of coordinate measuring machines include: stationary nature of work, large size and high complexity.

In addition to stationary coordinate measuring machines, there are also mobile, they are ideal for controlling the geometry of products while controlling the quality of engineering products.

The application of this system is quite wide, because it is used in quality control in laboratories, in production measurements, for measurements of large products, such as wear control, measurements in hard to reach places and parts of complex configuration, in limited space, measurements directly at the reception, fixing near the measured object, as well as for scanning and digitizing surfaces.

With the help of devices based on different methods of determining the chemical composition and alloy, determine the grades of steel.

Therefore, to control the quality of spare parts for mobile equipment, you can use many different methods and tools for quality control. Given the disadvantages of contact measuring instruments, it is proposed to use non-contact measuring instruments.

Thus, to increase the level of quality control of spare parts for mobile machines you need to: increase the accuracy and reduce the complexity of measurements; make available measurements of both geometric and physical-mechanical parameters of the controlled part; possibility of automation and robotization of measurements.

Factors affecting the accuracy of quality control of spare parts. During the process of quality control of spare parts with the use of measuring devices, there are many different factors that distort their readings. Indicators depend on the control conditions, methods and means of control used. To reduce the impact of these factors, it is necessary to determine the extent and nature of their impact.

Factors influencing the results of control by an automated measuring device can be divided into groups: parameters of controlled devices, properties of the controlled spare part, technological and other factors [4, 7].

Dependence of accuracy of measurements on the factors caused by parameters of the control and measuring equipment and properties of the controlled spare parts allows to continue theoretical researches of other factors influencing accuracy and productivity of measurements by contactless devices.

Influence of the distance from the radiation source to the surface of the controlled spare part.

The main factor that affects the accuracy of the automated measuring device is the distance from the radiation source to the surface of the controlled spare part.

To determine the effect of the distance from the radiation source to the surface of the controlled spare part, the error of vertical measurements of the automated measuring device is determined.

Influence of light radiation power.

The accuracy of measurements of spare parts of mobile machines using an automated measuring device largely depends on the visibility of the light line. The visibility of the light line is affected by: the level of light radiation, the distance from the radiation source to the surface of the controlled product and the properties of its surface.

To measure the brightness used photo - and video cameras that capture the visibility of the light line in the same range of color manifestations.

Influence of ambient temperature.

During changes in ambient temperature, the sensitivity of various methods and means of control changes significantly.

The study of the influence of ambient temperature on the control accuracy of the automated measuring device is performed by determining the temperature field of the tolerance of the device.

The content of the process of determining the temperature field of tolerance of the device is to determine the error of the control data at negative and positive temperatures.

Considering the method of input control of components, we can identify three series of work activities:

1) at the first stage the external inspection of production, check of accompanying documents (the passport, the certificate, invoices), existence of a mark of the supplier, date of manufacturing and conformity of completeness is carried out;

2) at the second stage - checking the quality characteristics of products;

3) at the third stage - check of serviceability of an element after installation on equipment.

The main results of the study. Therefore, when controlling the quality of spare parts, the radiation power level of the scanner varies from 1 to 11.25 mW. As the power of light radiation increases, the data error increases.

A very important factor is the distance between the radiation source and the controlled spare part. The factors of the distance between the radiation source and the controlled spare part, which affect the measurement process, increase the probability of measurement error by 6-7.5%.

An important factor is the influence of ambient temperature. Normal operating conditions at temperature t = 20 ° C. When the temperature is reduced by - 10ºC (based on normal conditions t = 30 ° C), the readings of the scales increase by 0.02 kg, and when the temperature is reduced by - 18ºC (based on normal conditions t = 38 ° C) the readings increase by 0, 04 kg.

The optimal modes of operation of automated measuring devices are: temperature from -10 to +40 ºC, control outside the optimum temperatures should be carried out using correction factors t_ (p.coef.) = - 0.02 kg, over -10 ºC over - 18 ºC t_ (p.coef.) = - 0.04 kg.

Determining the advantages and disadvantages of automated measuring devices allows to make certain conclusions about the operation of the device and on the basis of these conclusions to give recommendations as a development of automated quality control tools for spare parts of mobile machines.

The control of the mass of spare parts of mobile machines, with the help of automated measuring devices, allows to determine the parts that meet the requirements or are defective, ie this indicates their possible deviation in geometric parameters and inconsistency with physical and mechanical properties of the material.

Determination of physical and mechanical properties of spare parts is found in 25% of parts deviations in the chemical composition of the material and inconsistencies in steel grades.

Mass fraction of chemical elements: C is on average less than 0.16%, Si by 0.20%, Mn - 0.47% and others from nominal.

Quite often, the control of the chemical composition of the material in the defective parts, determines the chemical composition of a completely different brand of parts. Thus, steel St3 in comparison with steel 40X has a lower value of material strength, so this steel is often used by unscrupulous manufacturers to replace high-quality alloy steel in order to reduce the cost of production.

Considering the quality control system, it is possible to distinguish the following stages: control of raw materials, measurement of the first part, current control on machines, output control.

Incoming control of all materials and issuance of certificates for materials at the request of the customer, belong to the stage of control of raw materials, in addition, it involves their chemical analysis.

Current control on machines involves constant control by the operator for compliance with the size and other parameters of the part.

Output control - takes into account such stages as: selective control of the required number of parts, data entry in the protocol and packaging.

Quite important conditions for the quality of spare parts are their transportation and packaging, these stages are also controlled by input control specialists.

Quality control of spare parts in production with the help of automated measuring devices, detects up to 30% at the initial stage of application, which will significantly reduce the cost of repairing the entire unit.

Therefore, the quality control of spare parts is greatly influenced by such factors as: vibration, light, air dust; the main disadvantage of the automated measuring device is the lack of control over the hardness of the material; the most common defect concerns the mismatch between the chemical composition of the material and the grade of steel; in defective parts there is often a brand of other steel, which indicates a significantly lower strength of steel; deviation in the weight of spare parts indicates a discrepancy between other parameters, weight control will reduce the time to control other parameters.

Conclusions. Therefore, the use of low-quality worn-out equipment increases the need for spare parts, which negatively affects operating costs. There is a problem, the quality of spare parts, due to the percentage of spare parts shortage reaches 45%. Prior to that, the resource of spare parts does not meet the objectives, which leads to the use of operating costs.

Today, the products of machine-building companies are at the lowest level, about 56% of spare parts are not responsible for technical means, and most defects are related to physical and mechanical parameters of the data.

The main problems in the organization of input control are:

- ✓ provision of enterprises and service stations, technical means of measurement and regulatory and technical documentation does not exceed 30%;
- ✓ provision of qualified personnel - 35 - 45%;
- ✓ available measuring instruments do not allow to provide the necessary review and accuracy of measurements;
- ✓ quite often such indicators as roughness, hardness are not controlled, and microcracks and microcracks, in general remain unnoticed, also hard-to-reach parameters are not measured.

The main task is the formation and organization of the process of quality control of machine-building products, which takes place on the market and

dealerships. Timely identification of defective parts at technical service enterprises will prevent their use on mobile machines. It is necessary to organize a quality control service for spare parts and use modern control and measuring equipment.

The process of quality control of spare parts with the use of measuring devices depends on many different factors that create their display. The indicators depend on the control, the methods and means of control used. To reduce the impact of these factors, the extent and nature of their impact should be determined.

As a result, in order to increase the level of quality control of spare parts for mobile machines, it is necessary to: increase the accuracy and reduce the complexity of measurements; make available measurements of both geometric and physical-mechanical parameters of the control part; allow automation and operation of measurements.

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