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Product Quality Management in the Machine-Building Enterprise

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ABSTRACT: In this paper, we will consider the improvement of quality management systems that are adequate to market economy, as well as the justification of methodological and practical recommendations to improve the efficiency of the quality management system in a machine-building enterprise.

KEYWORDS: Quality, product, management, mechanism, technology, factors, typology.

I.INTRODUCTION

Competently organized quality management process is the key to increasing the efficiency of the enterprise. Today, the quality of products, as well as measures implemented to improve it, provide one of the competitive advantages of the enterprise in both the domestic and foreign markets. In turn, the competitiveness of domestic enterprises forms the country's image and is a decisive factor in ensuring national well-being.

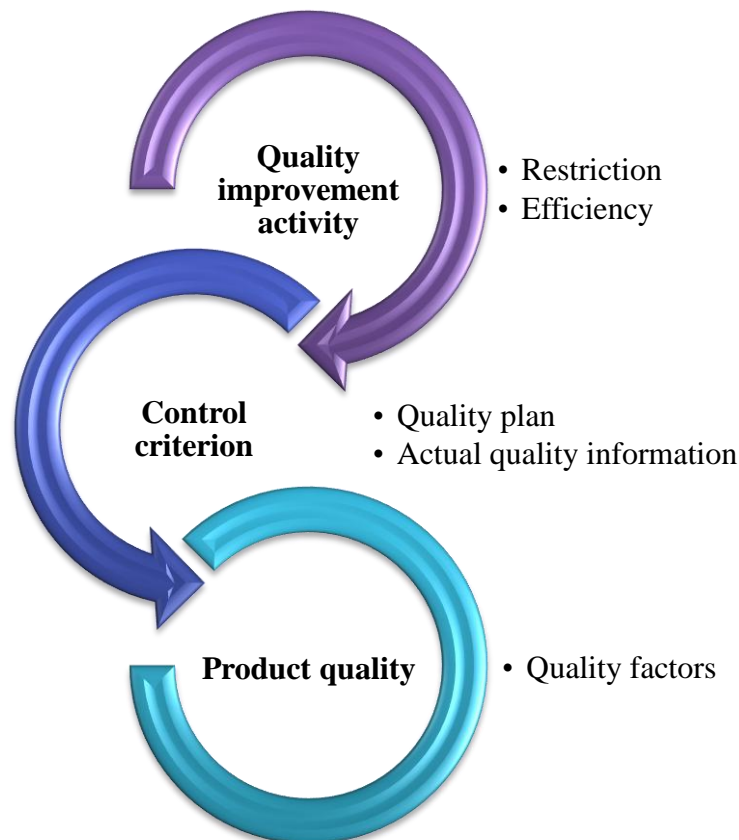
The saturation of markets by types of products and services, the prevailing non-price competition highlights the effectiveness of the functioning of the enterprise - product quality. The directions of improving the quality of products are determined by the level of development of scientific and technological progress, the level of professional literacy of the population, the organizations of the production process in an enterprise and other factors. Work in these areas provides improved living standards in the country, as well as the intensification of the national economy.

Predominantly, enterprises of developed industrial countries operate and rely on the growth of the technical level and quality of products.

The problem of quality is the most important factor in raising the standard of living, economic, social and environmental safety. Quality is a complex concept characterizing the effectiveness of all aspects of the activity: strategy development, production organization, marketing, etc.

But even more complicated is the interpretation of quality when considering it as an object of the management process.

To date, there are many definitions of the concept of "management" in different information sources. Management has found a fairly widespread use in the public life of people, but it is not standardized professionally. We will consider management in terms of product quality management in the enterprise.



Picture 1. The content of product quality management process

From Figure 1 it is clear that product quality management is a process that determines the nature and volume of product needs, evaluates its actual quality level, develops, selects and implements measures to achieve a given level of product quality.

Thus, the production as an object of quality management is only a small fraction in modern conditions, and the spectrum of these objects is much specific and diverse at present. Since this process appeared rather early and was studied the longest, its elements were singled out, the mechanisms of their interaction were determined, etc., on the basis of which product quality management was standardized.

Quality management - this is understood by the impact on the production process in order to ensure the required product quality [1, p.88]. This interpretation allows us to distinguish three controls: the control subject (who influences), the control object (what the impact is directed at) and the impact process itself. Having defined the object of management (production process), we will dwell on the process of influence itself - on the "mechanism", "technology" of quality management.

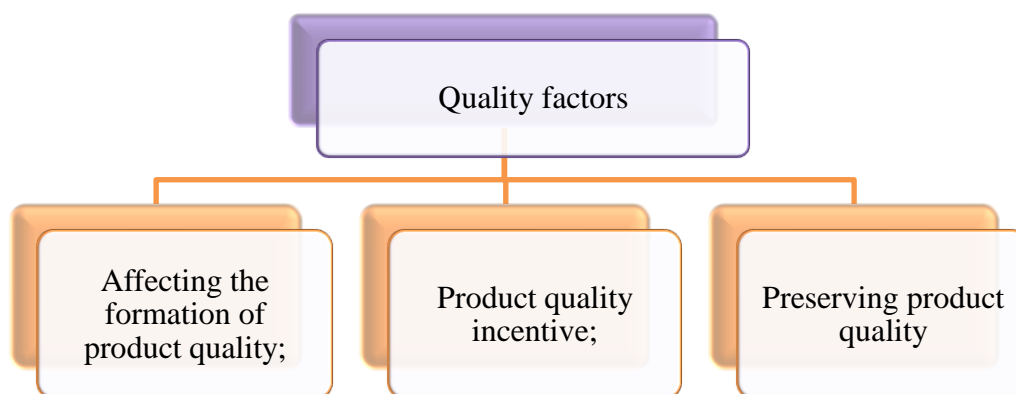
Product quality is one of its fundamental characteristics that have a decisive influence on the creation of consumer preferences and the formation of competitiveness.

In order to best meet the needs, it is necessary at the development stage to formulate product requirements. That is, to determine the factors and specifications, compliance with which will determine the scope of application of these products to use them for their intended purpose while respecting the expiration dates. However, there are certain differences between quality and requirements imposed on it, that is, the resulting product quality does not always correspond to the requirements imposed on it. In addition, the requirements are dynamic in time, constantly changing

and improving with the development of scientific and technological progress, technology and technology, the country's economy as a whole and the culture of society.

On the basis of the requirements set forth in the regulatory legal acts regulating the sphere of product quality regulation, the management of business entities form factors that directly or indirectly influence the provision of the standard quality level of products of the engineering industry.

The process of quality management begins with its formation, functioning is supported by stimulation and the results are fixed by preservation. Thus, the factors that ensure the quality of products can be divided into three groups:



The factors influencing the formation of product quality include:

- market research products; product requirements development;
- quality of raw materials and supplies; quality of design and engineering;
- quality manufacturing (processing); control of finished products [2, p. 100]

Raw materials and materials are one of the fundamental factors shaping the quality and quantity of products. There are main and auxiliary raw materials.

In turn, the efficiency of the production process, its social and economic feasibility, as well as features of the organizational structure of management at the enterprise, pricing policy, moral and material interest of workers, measures for the production of products that do not meet quality standards and others are factors that stimulate product quality.

The factors contributing to the preservation of product quality include a set of tools, methods and environmental conditions that affect the reliability of products.

Thus, factors aimed at preserving the quality of products as goods include:

1) Packaging is a means or a combination of means that makes it possible to protect the goods from damage, and also, taking into account the environmental friendliness of the goods and the packaging, to protect the environment from pollution.

The purpose of product packaging is to protect it from the adverse effects of the environment, to preserve its basic properties and characteristics, to maintain a constant weight category, to avoid product damage and to release harmful substances into the environment [2, p. 120].

An additional function of packaging is this stimulating way to purchase by means of a bright design, printing a brand logo, product information and promotions, that is, the formation of consumer preferences.

2) Transportation and storage conditions - this stage of the product life cycle is designed to ensure the safety of quality and the specified amount of products in stock and during transportation. Storage provides for the provision of the original properties of the goods and minimizing losses in compliance with the norms of deviations during storage of various kinds of goods. To do this, it is necessary to create and maintain certain conditions of storage and transportation,



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to provide means to control these conditions in order to comply with the established deadlines (storage, validity, transportation), to ensure the transparency of the movement of goods.

3) Commodity processing - provides for the preparation of goods for sale by means of compliance with the qualitative and quantitative composition. In the process of commodity processing, goods of a lower quality level are excluded, thereby increasing the overall quality level of a batch of goods. Also, the formation of the attractiveness of the goods using wiping dust, surface treatment with protective coatings: waxed, tinning, icing, polymer films) [2, p.140].

4) Implementation - the final stage of the movement of goods, which involves bringing the goods to the final consumer, taking into account his needs and preferences.

5) After-sales service - in a period of growing competition, the subsequent contact between the seller and the consumer becomes increasingly important. As a result of after-sales service, which consists in delivering to the place specified by the consumer, installing and installing, setting up and warranty repair, at the stage of choosing products on the market, the consumer establishes a psychological with the seller. This service option shows the seller's interest in each customer, and indicates the proper quality of the goods presented for sale.

In general, the above operations (factors) aimed at preserving the quality of products (goods) provide an increase in the degree of customer satisfaction during operation and form a positive consumer opinion in the market.

Planning the process of quality management is a fairly voluminous process, which consists in bringing to each department of enterprises tasks with based indicators that are necessary in the future to improve the qualitative parameters of their activity and interaction [3, p. 26]. Consideration of planning from the point of view of engaging all structural units in quality management is justified by the fact that product quality is the result of the labor of all workers, enterprises indirectly or directly involved in the production of products, as well as ensuring its delivery to the final consumer.

Forecasting the needs of consumers in the domestic and foreign markets from a scientific point of view is the basis of quality improvement planning. In addition, at the present stage of society acquires the value of after-sales analysis: a synthesis of the results of product exploitation, an analysis of customer opinions, a synthesis of information about the actual quality of products.

Planning for the improvement of product quality will then bring proper results when implemented at all levels of management, as well as at the stages of the product life cycle, from design to post-maintenance. To effectively plan for improving the quality of an enterprise, it is necessary to have the necessary amount of financial, material and labor resources, the effectiveness of the use of which must be economically justified.

The main tasks of planning the improvement of product quality are [3, P.28]:

- formation of economically justified tasks for each unit, with an indication of their resource support necessary for the implementation and taking into account the needs of consumers;
- creation of conditions for ensuring the output of products with specified properties and characteristics that meet the needs of the market;
- increase in the share of certified products;
- the current work with the documentation, including continuous monitoring and exclusion from the priorities set out in outdated regulatory legal acts. Compliance with the requirements set out in the current technical regulations, standards, technical conditions and other regulatory documentation;
- development and improvement of specific measures to ensure the achievement of a given level of quality;
- Transfer to the finished consumer of products of improved quality, as a result of which the competitiveness of products and the efficiency of the enterprise as a whole increase.

Planning for improving product quality is always reflected in the overall plans of the enterprise. For this purpose, individual and complex quality indicators are developed and used, which are classified in planning by type (operational, current, prospective) and management levels (divisions, sections, departments, enterprise as a whole) [4, p. 4].

Formation of the level of targets for structural units for quality improvement should be based on established quality indicators in the overall plans of the enterprise, as well as taking into account the possibilities of influence of the enterprise on them. Therefore, when developing planned targets for improving product quality for departments, it is



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necessary to take into account their place in the structure, current quality of work performed, further assessment and stimulation of production and business activities.

In addition to the plans for the production units of the enterprise, it is necessary to bring the planned tasks to the functional departments and services. So, the department headed by the chief technologist in the plan should go down the tasks according to which it is necessary to implement the introduction of modern technological processes, to equip the production with various devices, models, reduce (decrease) the scrap rate, etc.

According to the tasks that form the different sections of the plan, the process of their organization, coordination and regulation is carried out by the heads of the relevant departments [5, p. 7].

Important components of the planning of product quality indicators are elements of monitoring and monitoring the implementation of plans. The control involves the process of identifying and assessing the causes of deviations from the indicators of the specified plans or their implementation according to the results of the current analysis. There are two types of control: primary, carried out directly on the ground in the division, which received assignments to improve product quality and subsequent, conducted by other subjects of quality management.

Performing activity is not the only subject of control, it can also be amenable to separately performed work of the manager. Information obtained as a result of monitoring can be used in the process of performing all management functions [6, p. 46]. Therefore, it becomes relevant to consider planning and control as elements of a unified management system through the prism of planning, control, reporting, and management.

Also, the elements of common subsystems in the mechanism of product quality management include the motivation and encouragement of employees for the implementation of current plans to improve product quality, their activities in general, as well as favor to create a healthy climate in the team.

It is necessary to distinguish between internal and external motivation enterprise and prioritize.

The implementation of the motives and incentives of external motivation will have a positive impact on the behavior of the company's personnel, but the effect of its action is limited in time by the principles of hope and fear.

The value of intrinsic motivation at the present stage of development of production is greater compared to extrinsic, since the effectiveness of the motives and stimuli of intrinsic motivation has a longer-lasting effect on the attitude to work and the immediate results of labor. Strengthening of influence occurs with a greater coincidence of the internal state of a person to his work, as well as the diversity of the functions and work performed.

V. EXPERIMENTAL RESULTS

Self-awareness and orientation of employees are formed by managers under the influence of the frequently changing needs and tastes of end users. The basis of the formation is the following benchmarks [7, p. 14]:

- 1) The primary focus on the quality of the products, and not getting a positive financial result.
- 2) The main opinion about the quality of products is formed by the consumer, he is at the head of the assessment of the enterprise.
- 3) After production, the stage "Consumer of our products" is implemented.
- 4) It is necessary to involve all personnel in the management process quality.
- 5) Competent organization of information support, the use of statistical methods for making management decisions makes the process more comfortable and efficient.

The benchmark of staff involvement in the work to achieve the company's goals, as well as stimulating the development and implementation of improvements is carried out by the management through the following methods and methods [7, p. 14]:

- Determining the competencies required for each type of activity;
- selection of activities, continuing education and career planning;
- clarification and interpretation of responsibility and authority;
- developing personal and group goals, job guidance and evaluations results;
- involvement of management personnel in the formation of current goals and evaluation of management decisions;
- recognition and reward;
- accessibility of dialogue with management;
- Stimulating the development and introduction of innovations;
- ensuring effective group work methods (teamwork);
- timely information on suggestions and opinions;
- development of a scale for assessing staff satisfaction with working conditions;
- Tracking the availability and movement of personnel in the enterprise.

In domestic practice, there is a combination of the concepts of authority and responsibility, which results in implementing the principle of employee engagement, which will provide [8, p. 12]: awareness of their contribution to the overall business of the organization and its role in it, identification and assessment of factors hindering the development of personal and professional qualities of employees within an economic entity, admitting mistakes and taking full responsibility for the current problems that arise, the correlation of personal goals and objectives with the organizations of their knowledge and skills, open dialogue within the team both horizontally and vertically by the management structure.

Thus, the management of the enterprise determines the need for resources and the sources of their receipt to achieve the goals and objectives in the field of product quality management.

For the modern market, as shown by studies of domestic and foreign scientists, there is a steady tendency to increase the role of non-price forms of competition, especially competition of quality. Therefore, when organizing interaction with the market environment, the use of various types of management has become effective: industry, financial, personal, innovation, etc. And to improve the ability to co-ordinate with the environment at the enterprise, market research, benchmarking methods, logistic assessment methods, etc.

Thus, the analysis of quality management systems in foreign practice with a view to understanding the influence of various factors on the improvement process showed that it does not allow staying in the quantitative plane of the systems quality level already achieved, but requires a transition to more developed forms. The dynamics of the improvement of the quality management system are presented in table 1.

Table 1.
Dynamics of quality management system development

Criteria for the selection of developmental factors	Quality Management System Concepts		
The defining function of the system	control	management	planning
The carrier of the system development process	element	system	process
Focus of the development process	mechanism	typology	direction
Control object	product quality	system quality	process quality



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The degree of controllability of system processes	spontaneity	purposefulness	conscious adjustability
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The future development of the organization, theoretical and practical work on quality management is influenced by the process of expanding and deepening the concept of quality: product quality, process, system, enterprise, business, labor, life.

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