

METHOD OF IMPROVING THE EFFICIENCY AND PRODUCTIVITY OF THE PRODUCTION PROCESS UNDER CONDITIONS OF FUNCTIONING OF THE CALS SYSTEM

Savin Igor Alekseevitch, Savina Anastasia Igorevna
Kazan National Research Technical University named after Tupolev
Naberezhnye Chelny savin.ia@kaichelny.ru
Khoroshunov Andrey Vladimirovich
Lobachevsky State University of Nizhni Novgorod
1705kzn@mail.ru

Abstract: At present, in connection with Russia's accession to the WTO, the management systems of the enterprise, focused on ensuring high competitiveness of products, taking into account the specifics of its application, have acquired particular urgency. For diesel engines installed on KAMAZ vehicles, a typical condition for their use is long-term work under heavy loads. Under these conditions, the most important indicator of competitiveness is the absence of failures associated with hidden defects in production. We can talk about a kind of "defect-free competitiveness". At the same time, it is necessary to ensure the lowest possible level of production costs. This is achieved by preventing and eliminating the causes of defects in production, which leads to a reduction in forced insurance inventories.

Keywords: TQM, built-in quality, CALS-technologies

The concept of quality built into the production process uses the philosophy of TQM, referring to the transition from quality control (inspection) to the so-called "built-in quality". The control of the technical control department does not add value to the products, and the experience of applying the inspection as the main method of quality management has shown its inefficiency, primarily because of the growth in the staff of controllers and their small influence on the quality itself. Thus, the implementation of the concept of built-in quality, creates a quality that is provided by processes, not control over them. [1] The purpose of the integrated quality concept is to guarantee quality at every workplace. For the workers, this means that the mistakes they make must be discovered and corrected right there, in the workplace. This approach is fundamentally different from the practice adopted at Russian enterprises, whereby by means of statistical control the lots of manufactured goods are checked, i.e. The principle of detecting defects instead of warning them. [2]

Improvement actions should include:

- analysis and assessment of the current situation to determine the areas of improvement;
- setting goals for improvement;
- search for possible solutions to achieve the goals;
- evaluation and selection of solutions;
- implementation of selected solutions;
- measuring, checking, analyzing and evaluating the results of implementation to determine whether the objectives are achieved;
- registration of improvements in the form of changes in standards.

The results should be analyzed in order to establish further opportunities for improvement and be reflected in the form of modified work standards. Thus, improvement is a constant action.

Feedback from consumers and other interested parties, QMS audits and analysis can be used to determine opportunities for improvement.

The use of CALS-technologies allows in practice to implement the process of continuous improvement, greatly simplifying the process of collecting and analyzing the necessary data [3], identifying existing problems and potential areas of improvement, increasing the reliability of post-paiting information (analyzed data).

It is possible to evaluate the efficiency of the enterprise that implemented and uses CALS-technologies from two positions. The first position is related to a qualitative assessment of the improvements obtained [4]. Here you can note the following positive points:

- classification of information (electronic data) circulating in the enterprise and characterizing processes, allows to identify and track data when they are exchanged inside and between processes / operations. Classification of data by the criterion of actions taken on their basis allows you to objectively and as soon as possible adjust the parameters of current processes, correct or prevent possible inconsistencies in time, which facilitates the analysis of the situation on-line and the continuous improvement of the enterprise. The establishment of general requirements for the methods of the electronic data submitted will allow the approval of those forms whose visibility and completeness will facilitate rapid and objective analysis and the adoption of appropriate decisions on making the necessary changes in process parameters;

- the definition of types of information coming to the inputs of processes, as well as information at the outputs of processes, allows to identify existing relationships between departments and ensure the transparency of their activities;

- the use of electronic digital signature will ensure the legitimacy of the electronic document, which is a necessary condition for paperless data exchange technology;

- the distribution of duties and authorities at the stages of analyzing input information and making appropriate decisions based on it ensures a clear traceability of each process from the moment of receipt of information to the adoption and implementation of appropriate actions, makes it possible to assess the objectivity of the analysis of information;

- the establishment of the procedure for the development of documents in the electronic version provides access to these documents to any participant in the product life cycle at any time within the limits of his authority. Establishment of a procedure for reviewing, amending electronic versions of documents, as well as procedures for updating the regulatory documentation, provide an opportunity to promptly inform employees of changes in documentation at low costs (reusable data usage with one-time input without additional costs for duplicating documents). The distribution of responsibility and authority, the establishment of the storage order allows you to order the documents stored electronically, eliminates the problem of information leakage and loss of important

data. Timely updating of electronic versions of documents and updating of electronic data contributes to obtaining reliable and complete information;

- Establishment of the procedure for monitoring and modifying the information support system allows identifying the inconsistencies that arise, predicting and preventing failures, and providing a process of continuous improvement of the information support system. Increase the speed of making changes and bring them to the performers. The second position is related to the financial evaluation of the expected effect.

This methodology assesses the prospects and forms a documentary base for using information support for the life cycle of products based on CALS-technology.[5]

As a result of the introduction of the proposed methodology, production costs can be reduced to 30%.

References

1. Могилевец В.Д., Савин И.А. Хосин канри: опыт применения в рамках сотрудничества КАМАЗ-НЧФ КНИТУ-КАИ//Компетентность. -2014. -№ 2(113).
2. Могилевец В.Д., Савин И.А. Микроэлементное нормирование как метод повышения эффективности производства/ В.Д. Могилевец, И.А. Савин//Компетентность. -2015. -№ 5 (126). -С. 49-55.
3. Могилевец В.Д., Савин И.А. Разработка ИСМ предприятия на соответствие стандартам СМК и бережливого производства/ В.Д. Могилевец, И.А. Савин//Компетентность. -2017. -№ 5 (146). -С. 28-31.
4. GOST R 56404-2015 Lean production . Requirements management systems.
5. Савин И.А., Могилевец В.Д. Снижение себестоимости: применение концепции DFM/DFA и мультибазисного распределения общепроизводственных расходов // Современный мир изменений. 2016. №1 с. 78-84