Measures to the improvement of efficiency of a repair enterprise

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Abstract. The article considers work of an enterprise created on the basis of the repair unit of a large industrial complex. It indicates the problems in the organization of the activity of new repair enterprise and the ways of their solution, aimed at the increase of the production efficiency, including those associated with staff motivation.

1. Introduction

Modern enterprises are fitted with a variety of equipment: installations, robotic complexes, transportation vehicles and other expensive types of fixed assets. In the production process, they lose their working qualities, mainly due to wear and destruction of individual parts, thus the accuracy, power, performance and other parameters of machines and mechanisms are reduced [1-6].

To compensate for wear and maintenance of equipment in the operational state, it is required to take systematic measures for its technical diagnostics, maintenance, repair work [7-8].

Maintenance is referred to complex operations to preserve the operability or health of equipment when it is used for its intended purpose, while waiting, storing and transporting.

Repair is the complex of operations on the restoration of health, operability or service life of the equipment or of its component parts.

The equipment wear during its operation and the inefficient organization of maintenance and repair results in the downtime increase, deterioration in the processing quality and an increase in defective products, as well as in repair costs growth [9-17].

The value of improving the organization of maintenance and repair of equipment can be inferred by the following indicators:

1. The annual costs of repair and maintenance of equipment at enterprises amount to 10–25% of its original cost. Their share in the cost of production reaches 6–8%.
2. The number of repair workers ranges from 20–30% of the total number of auxiliary workers.

Based on the above, the main tasks in planning the activities of the repair service of the enterprise are:

1. Preservation of equipment in good working order, technically sound state, ensuring its high performance and smooth operation.
2. Reduction of time and cost of maintenance and all types of repairs.

The solution of these tasks requires organizing proper operation, routine maintenance, timely performance of necessary repairs, as well as equipment modernization.
To perform all types of work on the organization of reasonable maintenance and repair of equipment and other types of fixed assets at enterprises, repair services are created [18].

Like most modern production facilities in our country, Norilsknickelremont - the largest repair enterprise in modern Russia today, was formed as a result of reorganization transformations of the industrial giant of non-ferrous metallurgy of the Soviet era.

The decision to transfer personnel engaged in the repair and maintenance of fixed production assets to the so-called Repair Directorate was preceded by a huge preparatory work that lasted more than two years. The basis for this was a decision made by the Company's management concerning the industry principle of dividing and delimiting the functions between a “Customer” and a “Contractor”. In addition, the work carried out previously by the own-account construction (“cost-effective way”) did not have transparency both in its monetary and labor-intensive parts.

2. Results and Discussion

As a result of the industry restructuring, a new wholly-owned subsidiary dependent company with a staff of more than 10,000 people was formed. It is important that in the course of all step-wise transformations it was possible to preserve the production potential of the repair industry, not allowing extreme social conflicts among workers and disruptions in the production activities of the entire Company. The new enterprise has significantly increased the range and scope of work, starting to independently function as the Company's Repair Industry in the Far North region.

Along with the excellence in the production and economic activity of the enterprise over the past 5 years (ensuring the growth of labor productivity by more than 20%, an increase in wages by 1.7 times, a significant update of funds through investments, etc.), the most significant problems were also identified, namely:

1. The lack of a mechanism of motivation for the enterprise to obtain the maximum financial result.
2. The lack of accounting for the actual technical condition of the equipment in the system for planning the maintenance and repair of fixed assets of the “Customer”.
3. Wages are not competitive enough: both for the long-term involvement of qualified personnel in the region, and for the retention of existing staff.
4. In the ratio “qualification - complexity of work performed - working conditions - remuneration of labor”, maintenance personnel are inferior to production workers, although maintenance personnel often work in more severe conditions that are dangerous to health (high gas pollution, tight working space, work at height, etc.)

The staff turnover of the enterprise increased to 12% per year.

To eliminate the identified problems, it is necessary to develop a new scenario plan for the further development of the repair company.

The analysis of the effectiveness of the repair company, even in similar areas of industry, is determined by various indicators or a system of indicators. This is due to many specific features and established factors of enterprises' activity. Thus, the approach to the system of planning and organizing repairs, as well as determining the criteria and indicators of the economic efficiency of the work of maintenance personnel, ensuring the main production efficiency, should be separate. Performance indicators, in turn, can be both individual and generalizing the work of repair services [19].

However, in the first place, the development of a repair enterprise directly depends on the production organization system being built.

3. Problem statement

Thus, within the framework of the development of the specialization of maintenance and repair (MaR) of the fixed production assets of the Customer, independent infrastructural subdivisions were formed at the repair company aimed at:

- Maintenance and repair of mining equipment;
- Maintenance and repair of equipment for processing and metallurgical conversion;
- Maintenance and repair of automobile and railway transport;
Maintenance and repair of instrumentation and automated control systems;
- Maintenance and repair of underground self-propelled diesel equipment;
- Maintenance and repair of energy equipment. The following steps are aimed at implementing the existing methods of repair effects on industrial capacity of enterprises:
- Aggregate-unit (impersonal) method of repair (pump park, stop valves, electric motors, numbered vehicle units, subassemblies and units are meant)
- Service (complex) equipment maintenance is effectively put into practice in a separate workshop or building;
- Operating mode adjustment and vibration diagnostics of the equipment in use, for example, of the conversion plant, since a significant number of units with rotating parts of mechanisms is used in the production of raw materials.

Unfortunately, the above-mentioned measures for the development of the production activity of an enterprise are rather local in nature and do not solve the key tasks that are particularly relevant today.

It is necessary to radically change the organizational structure of the enterprise by separating producing departments into independent branches.

For doing this, the following scheme is proposed.

At the first stage, it is necessary to centralize profile functions at the Enterprise Management Department, such as: procurement of goods and services; investment activities; logistics (warehousing); labor protection and industrial safety; ecology and nature conservation activities; economic security; accounting; financial activities; legal support of the activity; staff training.

The centralization of these functions at the Enterprise Management will not only facilitate effective management of budget processes based on the ERP (Enterprise Resource Planning) information platform [20], but also allow a unified investment and social policy, thus making it possible for the subdivisional managers to directly concentrate on their production programs.

According to the authors the next stage, is the creation of the Management Company on the basis of the Enterprise Management with non-core activities being transferred to it, such as: providing IT support services; surveying services; welding laboratories; recruitment agency services; organization of a military registration office and transport dispatching.

At the final stage, it is necessary to allocate all newly-created producing departments with certain rights that allow carrying out business processes. In this regard the best option is to create branches. That is, on the basis of the seven formed subdivisions, it is necessary to form seven branches. In this case, the “main production order” for the provision of maintenance and repair services will be accepted (processed) directly through the Company's Management Company, and the additional volumes of work arising during the official year will be independently considered by the established branches.

Branches on the virtue of the power of attorney of the head of the enterprise will have certain assets and have two current accounts: a primary current account designed to fulfill the main order from the Mining and Metallurgical Company, and an accumulative subaccount on which the funds received after performing additional orders from organizations located in the region of the Far North.

Eventually, according to the results of the year (quarter), it will be possible to assess the activities of branches and, by decision of the company's management, make bonus payments. Thus, through outsourcing [21-26], the Management Company will provide non-production services to affiliates, and those, in turn, will be given a certain freedom in making management decisions that allow them conducting business processes. The scheme of interaction of the new structure of the repair enterprise is presented in Figure 1.

Thus, branch managers, specialists and workers will be directly motivated to carry out not only the main order with existing resources, but additional amounts of work as well. To do this, they will need to constantly improve their professional activities, improve the production culture, and introduce advanced technologies and innovative materials. The results will be immediate: the level of equipment maintenance will improve, the technology of repair and rehabilitation works will be improved and, consequently, the cost of maintaining Customer fixed assets will be reduced.
4. Conclusion

The expected effect from the implementation of all the above proposals is:

1. Creating conditions for staff motivation to increase productivity due to the presence of an element of business.
2. Independence of the branch manager in making management decisions.
3. Creating a competitive environment in the region of the Far North among other contractors.
4. Creating conditions for professional development of highly qualified specialists and reduction of personnel outflow.
5. Improving the quality of repairs and, as a result, reliable and stable performance of the equipment operated, which is involved in the main production flow of a Customer.

Figure 1. Interaction of the structure of the repair company.
6. Mutual understanding of the problems of the main production and repair business, expressed in providing the necessary level of equipment operability for a Customer and optimizing the costs of its maintenance and repair.

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