

The importance of optimizing maintenance management for efficient operations



Executive summary

Based on our optimization project experience both globally and in Russia, Deloitte has identified key problems in maintenance functions and has developed a model to optimize maintenance for the improvement of operational efficiency.

Key problems relate both to economic issues (inefficient use of financial resources) and issues of production (increased equipment downtime). The underlying reasons are, in nature, organizational (inefficient business processes) and methodological (absence of a differentiated approach for each piece or category of equipment).

Problems with maintenance management cannot always be blamed on a few managers or workers. Maintenance management is a complex process requiring an effective combination of technical and economic expertise. Deloitte therefore offers a comprehensive solution for improving maintenance management systems by looking at them as a whole, from adapting the organizational structure of a maintenance department to establishing approaches for differentiating and categorizing equipment and spare parts.

Below, we give an in-depth description of the main problems in maintenance management systems and we give an overview of the Deloitte model for improving the efficiency of maintenance services.



Current state of maintenance management

In the highly uncertain economic climate of the moment, a major priority for Russian companies is to improve operational efficiency. Maintenance departments have traditionally been budgetary “black holes,” although the current level of equipment obsolescence in the Russian Federation industry exceeds 60%.

The Soviet system of maintenance was aimed at ensuring products were produced and distributed (product output) in the required quantities without considering the cost. Under the conditions of the free market economy, this system does not allow products to be competitive in the global market. The tactic of cost minimization has replaced the Soviet system, therefore equipment is used until it is completely worn out, and maintenance resources and provisions are reduced.

The accelerating rate at which equipment is becoming obsolete in the industry means that continuing to reduce maintenance expenditure as is the policy at the moment, is no longer possible. Today's systems of maintenance management are characterized by inefficient use of allocated funds, and therefore prevent the transformation of costs into output.

While implementing projects for optimizing the operations of international and Russian companies, Deloitte's consultants have identified the following problematic areas in maintenance management systems and when performing maintenance works:

No standardized approach for prioritizing equipment maintenance works

Decisions to perform maintenance on pieces of equipment are made by specialists when equipment fails, or is identified as failing by a large number of specialists congregated together. This process is informal, time-consuming and does not ensure that the most reasonable, pragmatic decision is made. Allocation of funds is decided according to the recommendations of an expert, which vary significantly depending on the expert's qualifications (e.g. specialism as a mechanic or electrician, amongst others).

Allocation of additional funds leads to an increase in staff costs and number of spare parts without significant improving the reliability of equipment

Increased spending often has the following effect: maintenance specialists buy spare parts to stock up, as they want to be prepared in case funding is reduced, so they don't acquire only what is actually needed. On the assumption that they will eventually be used, expensive spare parts are purchased. For the company as a whole, however, a large stock of expensive spare parts is of little use to them in the short term, if not, at all.

The size of the maintenance staff increases for similar reasons: increase of in-house staff reduces the risks of long-term equipment downtime, as significant labor resources can be concentrated on eliminating the reasons for equipment failure. The practical implications of increasing personnel numbers in day-to-day operations, though, is not taken into account.

Dividing costs into major repairs, minor repairs and technical maintenance often has no practical use and helps to conceal costs.

Russian companies have traditionally divided costs into major repairs, minor repairs and technical maintenance. An analysis led by our consultants highlighted a lack of formal criteria for dividing costs according to the nature of maintenance work being performed. Despite what finance departments might think, defining technical maintenance costs is extremely unclear. Division of costs into the above categories allows the overall cost for maintenance to be manipulated. By splitting maintenance costs into different categories, total maintenance expenditure is understated, as technical maintenance is often separated from the overall maintenance budget.

The cost of internal staff is not included in maintenance costs, which has a significant impact on the assessment of costs.

Internally produced work accounts for 30-70% of all work performed, however, internal staff costs are excluded from maintenance budgets on a regular basis.

A comparative analysis of maintenance costs per production unit does not mean the effectiveness of the maintenance function is assessed properly.

The measurement of maintenance cost share in cost per ton is influenced by the number of production process stages, internal staff costs, and technical maintenance costs.

When additional stages are added to the process, maintenance costs increase because the number of equipment units increases, although the output of finished goods remains unchanged.

Internal staff is not always stated separately as a maintenance costs, where applicable, therefore, the total maintenance budget may be significantly understated.

The cost of technical maintenance may not be listed under repair costs, but under production costs instead. Despite the logical reason for why this might be done, up to 50% of maintenance costs can be concealed in this way.

The main issues for Russian companies are related to internal staff and technical maintenance costs. Foreign companies often have fewer process stages and reduce the share of maintenance costs in the cost for manufacturing their products.



Budget-based pricing is not transparent and can lead to differences in accounting for actual cost, volume of work, and timings for completing work

Budgets form the basis for pricing for the majority of Russian companies. Although this system would seem transparent, there are a number of major issues: inconsistency between budget cost and actual market price, the creation of backup supplies as part of maintenance and repair operations, inability to anticipate downtime, and the large amount of time required for budgeting for non-standard and emergency work. These factors mean that pricing is not at all transparent, and budgets determine market price and length of time required to complete works. This is the result of the inflexibility of budget-based pricing models in a market economy.

Strict regimentation of repair activities does not increase overall efficiency

A number of companies prescribe each step of a repair in great detail to operate more efficiently and, therefore, reduce costs. This approach is based on the simple application of a lean manufacturing model to maintenance and repair works. The key difference between maintenance and production is that maintenance does not involve a standard set of activities. The key problem for optimizing maintenance is deciding upon which works are needed so that a work plan is carried out on time and on budget. Detailed documentation does not solve the problem.

Detailed documentation is needed for major repairs that are complex, but it is of little value for many everyday, minor repairs.

Decisions are made centrally by senior management with the participation of only a few specialists to immediately service equipment

Foremen and floor managers (junior managers) best understand the state of equipment and repairs that are needed; however, all the decisions are made by senior managers or their superiors. In order to make a well-founded decision, they need to involve a large number of employees, which is not always possible, and decisions are made less efficiently and are less sound. Line managers are not given the appropriate levels of authority to make sure objectives are achieved.

Problems with communication and joint planning between specialists of different disciplines (mechanics, electricians etc.) mean equipment downtime increases

Senior managers have to coordinate various types of works. This does not allow for effective and quick planning of each time that equipment stops, and it does not allow for working towards a reduction in equipment downtime. Cooperation of services is based on the personal relationships that managers have with one another, and so due focus is not given to increasing maintenance efficiency.

The above problems are common to many industrial companies. It may be difficult for senior management to see all these problems as middle managers often prefer to keep the status quo and will not suggest changes to the system.

Many of the problems listed above are common to companies in Europe and the USA as well; they are not specific to Russian companies. So that management can manage maintenance costs with due consideration of market requirements and production needs, Deloitte uses the best international practices to develop a system for maintenance management.

Suggestions for organizing a maintenance management system

After analyzing issues regarding maintenance management, Deloitte's consultants identified a number of key criteria to create a target management system model:

1. Achieve production plan targets within the maintenance budget.
2. Responsibility for ensuring equipment is in good condition should be transferred to line managers, and at the same time, there should be effective controls over expenditure.
3. A differentiated approach should be used for maintenance and repairs items, taking into account their condition and impact upon the company's financial results.
4. Maintenance costs should be categorized and presented in the best way to help the management's decision-making process.
5. A differentiated approach should be applied for purchasing spare parts and developing an inventory policy.
6. Effective communication is extremely important between the specialists of different departments.
7. Scope and timescale for completion of work should be planned using concrete, measurable indicators.
8. Work with contractors should be based on how much their services cost and an assessment of the risks associated with engaging their services.

An integrated maintenance management system should cover different aspects of a company's activities. At the same time, such a system should be based on promoting innovative approaches to categorizing equipment and creating the maintenance function structure. A new maintenance management system is helped by new budgeting, planning and performance processes; budget templates and accounting documents; and a methodology for managing stocks of spare parts and relations with contractors.

Basic elements of the model

Equipment differentiation

The basic element of a maintenance management system is differentiating equipment according to technical condition and impact on financial results. Equipment differentiation is needed for prioritizing funds and taking the appropriate maintenance and repair steps for each item of equipment according to its nature.

Prioritizing funds can only be done effectively when equipment units are correctly ranked in terms of value to the company. When equipment is classified and assessed, the main challenge is to consider the needs of the whole company: what might be critical to one department might not be critical to the company as a whole.

To overcome these challenges, you need to use a method of sequential comparison once a number of activities have been carried out: analyzing equipment at different sites, and analyzing how production lines impact the company's financial results. Risks and requirements related to industrial safety and environmental protection should also be considered.

Dividing equipment into categories helps maintenance and repair personnel to carry out their work and the company's management to allocate funds more effectively.

Organizational Structure

Concentrating authority at a senior level means that decisions take longer, and far too numerous 'experts' are required. An effective maintenance management system delegates responsibilities to more junior management levels (to foremen/floor managers).

Another issue is the interaction between maintenance staff and repair staff. This issue is particularly acute when maintenance is separate from repairs; however, a unified workshop for maintenance and repair staff will not necessarily solve this. In a unified workshop, problems are often not reported and are solved on an individual basis by the manager of the workshop.

To solve these problems, foreign maintenance and repair operations have developed an effective practice: they make part of the staff responsible for ensuring cooperation between technological subdivisions requesting the repairs, and the other part responsible for carrying out the repair works. In such instances, the employee responsible for cooperation with the production department must have authority to allocate funds and plan the work required. The worker carrying out the repair will have to ensure that a quality repair is performed, in accordance with the requirements of the task.

Supportive elements of the model

Regulation of maintenance management processes

Lack of standardized processes is a widespread problem in maintenance management. When reorganizing a maintenance management system, focus needs to be on the following key processes: annual planning and budgeting for maintenance, intra-annual and monthly planning of works, dividing labor for tasks between those who perform and those who oversee the task, purchasing of spare parts, and engaging contractor services.

Processes are based on a new organizational structure and the categorization of equipment. The new processes are designed to optimize the performance of the maintenance staff and establish the implementation of a new labor management system in detail.

Management of spare parts

Optimizing the inventory is key for a company's working capital management, and it can often be improved. On the other hand, adopting a policy of low spare part stocks risks production being suspended for a long period of time. To determine the optimal numbers of items needed for an inventory, a differentiated approach to managing spare parts is required.

Spare parts should be categorized according to their importance to a company's production processes. Such categorization is based on the equipment differentiation carried out when implementing the basic elements of the model.

Working out an appropriate strategy for purchasing and maintaining inventory stocks depends on how critical a stock item is and how long it takes to deliver that item. For example, there should be a permanent supply of spare parts for equipment that is critical to production processes and in poor condition in order to minimize downtime.

Contractor management

The decision to outsource maintenance workers or keep an internal staff clearly defines how a maintenance department will develop. When deciding to fully or partially outsource maintenance, the decision cannot be based on financial calculations alone, as they have limited use when assessing the risks involved in deciding to outsource.

For maintenance management, it is necessary to consider the category of the item of equipment and to compare the advantages of outsourcing with the advantages of developing and using an internal staff. For key pieces of equipment, internal staff should be used for maintenance. Alternatively, potential losses from improper performance of maintenance works can significantly increase the advantages of outsourcing maintenance.



Conclusion

Technical maintenance and repairs are problematic for most industrial companies. In Russia, the situation is worsened by high levels of equipment obsolescence and the fact that the model that ensured production in the USSR does not work in the current conditions of a mobilization economy.

The brief analysis in the first part of this document shows the set of problems for maintenance management. The complexity of a problem varies from company to company. An integrated solution is required in order to improve efficiency and value for money for maintenance management in the long term. Making 'cosmetic' changes can, in the medium term, increase maintenance costs and hidden costs or can significantly damage the reliability of equipment.

Deloitte's methodology sets out three consistent stages for improving maintenance management: analyzing problems and working out where the current model deviates from the target model; adapting processes, tools and organizational structure and categorizing equipment; and finally, implementing a new maintenance management system.

As part of the first stage, Deloitte's team analyzes the current maintenance management system according to various criteria, and determines the specifics of a company. This work is the basis for creating a target model and enables us to identify opportunities for improvement.

Deloitte specialists work in a team with the company's staff to establish target processes and tools.

A detailed analysis of each production line enables the team to develop a management model that will enable the company to make the target maintenance management model a reality. At the same time equipment is differentiated according to Deloitte methodology, which helps to save time while implementing our project.

The company's employees then implement the developed model. The focuses at this stage are the move to the new organizational structure, and stronger processes, procedures and documentation.

The success of the project depends on the cooperation between Deloitte and the company's employees. Employees need to be involved in developing and implementing the new processes, as well as understand the target model, as they will become the agents of change within the company. Later on, they will be responsible for managing the changes.

The duration of the project, from the initial analysis to the successful transfer to a new organizational system, is approximately a year and a half. Timings may change depending on a company's ability to adapt to changes and the current state of the maintenance department.

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