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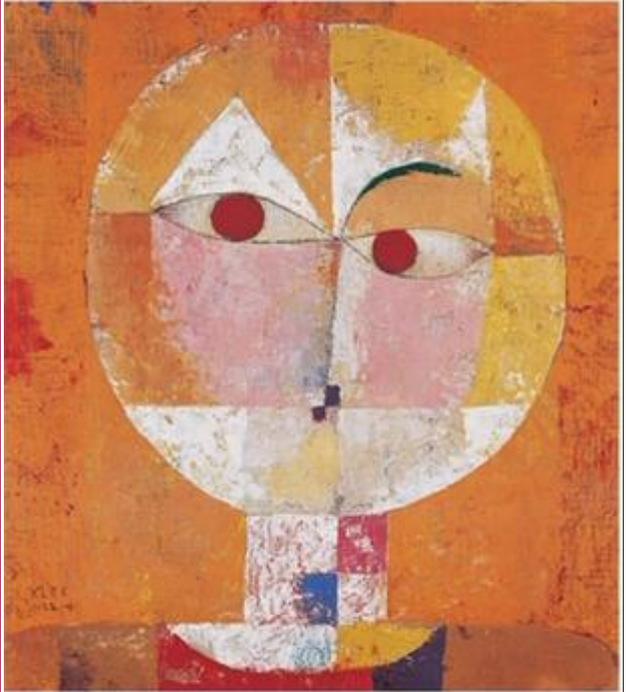
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Methods of functional and process accounting of environmental costs

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Abstract

The article discusses issues related to environmental protection of a number of construction companies, reveals the essence of environmental protection costs, as well as the need to form an active environmental strategy and its

implementation via the scientific apparatus of management accounting, standard methods of analysis and evaluation. As a result, economic entities must independently identify the qualifying features of environmental protection costs and their functional capabilities. In conclusion, improper organization, work and ill-conceived technologies entail enormous costs of materials and energy and lead to severe pollution of the natural environment.

Keywords: Environmental, Protection, Costs, Management, Construction.

Métodos de contabilidad funcional y de procesos de costos ambientales

Resumen

El artículo analiza temas relacionados con la protección ambiental de varias empresas de construcción, revela la esencia de los costos de protección ambiental, así como la necesidad de formar una estrategia ambiental activa y su implementación a través del aparato científico de contabilidad de gestión, métodos estándar de análisis y evaluación. Como resultado, las entidades económicas deben identificar de manera independiente las características calificativas de los costos de protección ambiental y sus capacidades funcionales. En conclusión, la organización inadecuada, el trabajo y las tecnologías mal concebidas implican enormes costos de materiales y energía y conducen a una severa contaminación del medio ambiente natural.

Palabras clave: Medio ambiente, Protección, Costos, Gestión, Construcción.

1. INTRODUCTION

Environmental impact assessment is a procedure of accounting the environmental requirements of state legislation when preparing and making decisions about the socio-economic development of society. Such an assessment is organized and carried out in order to identify and take the necessary and sufficient measures to prevent the possible unacceptable social, economic and other consequences with them of the implementation of economic or other activities.

Environmental protection is necessary for society and it is an integral part of the economic activity of enterprises in the course of which a set of measures should be taken, aimed at preventing, reducing or eliminating the consequences of the harmful effects of the main production activities on the environment and requiring special consideration, control and stimulation due to their low profitability for enterprises and importance for society (NASAKINA, 1999). Today it is quite obvious that any social and economic problems that have arisen need to be solved, taking into account the requirements of environmental protection. At the same time, any desire to get only economic profit from activities, without taking into account possible environmental consequences, leads to rather

harmful effects on the natural environment and negatively affects human health (EROKHINA & LESINA, 2015; MEHENNA & VERNON, 2004; MACHADO ET AL, 2019; BI & SHI, 2019).

In view of the fact that construction activity is closely interconnected with human intervention in the natural environment, in order to preserve the ecological balance in nature and its protection, it is necessary to make architecturally and other decisions reasonably from an ecological point of view (GOGOLEVA & BAHTURINA, 2015; PETROV, 2018).

The general contractor in the process of carrying out construction work is obliged to comply with the norms established in legal state acts and in the law of the Russian Federation On the protection of the natural environment. In addition, the law of the Russian Federation also provides for the possibility of suspending the construction (reconstruction) of an object on the basis of a court decision, as well as suspending the commissioning of buildings, structures, buildings, buildings and other real estate objects. The negative consequences of the realization of environmental and

economic risks that are associated with any violations are shown in Figure 1.

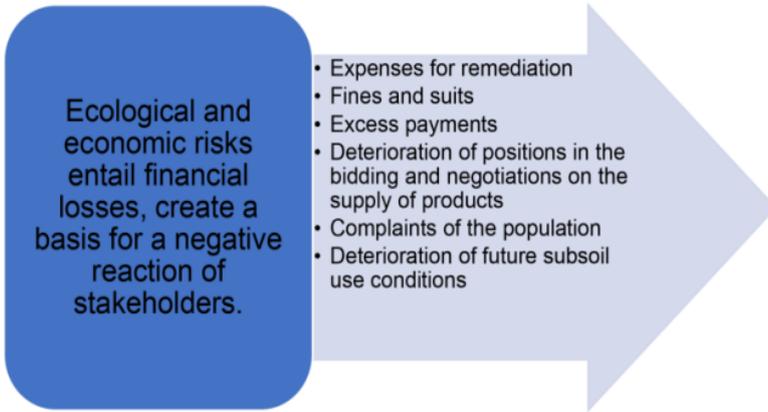


Figure 1: The negative consequences of the implementation of environmental and economic risks associated with violations of environmental legislation.

The general contractor in cases of causing any harm to the natural environment must fully compensate for the damage caused. Thus, state bodies regulate the protection of the natural environment, obliging production companies to bear full responsibility for the environmental cleanliness of their production by compensating for the damage caused by their own funds. Summarizing the above, it is worth noting that construction companies must perform a number of

activities aimed at restoring and preserving the natural environment. As a result, construction companies incur significant costs in cases of repairing the damage, restoring the natural environment. Therefore, competent management of environmental costs plays an important role in the formation of the financial results of the company.

2. MATERIALS AND METHODS

At present, the issues of accounting for environmental safety costs remain virtually unresolved or are debatable. In particular, they include: the lack of a unified classification of costs for environmental safety, the imperfection of the methodology for their accounting and, as a result, the veiling of these costs in the total cost of an organization, the lack of systematic information on the costs of environmental safety in the organization's financial and management reporting, imperfect methods of analyzing their impact on the financial performance of the organization.

Analysis of the works of modern Russian scientists considering the classification of environmental costs, allows

us to conclude that there is no single approach not only to the method of accounting, but also to the definition of the very concept of environmental costs (MURUEVA, 2007). According to the author E.V. Morozova, environmental costs arise as a result of the interaction of the organization and the natural environment and, as a rule, are allocated in the form of costs for environmental protection, reproduction of renewable resources and payment of negative impact on the environment (MOROZOVA, 2007). According to the author E.G. Gusakovskaya, environmental costs are understood as environmental costs, which are a sum of all types of resources necessary for environmental activities (GUSAKOVSKAYA, 2004) and K.S. Saenko proposes to proceed from the fact that the environmental processes of an economic entity should be considered in the areas of environmental management: development, production, use of natural resources; negative impact on the environment; environmental activities (SAENKO, 2005).

3. RESULTS

At that time, as the modern industrial production on the environment is becoming increasingly aggressive, the issues of accounting and analytical support for controlling the costs of environmental safety remain virtually unresolved or are controversial. Accordingly, accounting and environmental costing are becoming increasingly important (EROKHINA & LESINA, 2015). Currently, an effective environmental strategy is required (Figure 2). At the same time, a significant role in this strategy should be given to the costs associated with the implementation of environmental measures.



Figure 2: Environmental active strategy

After analyzing the information on this issue, we propose the following definition:

The cost of environmental activities is the use of various resources (labor, value and material); aimed at eliminating the negative impact of a number of technological processes on the environment and on the livelihoods of the population, as well as on the company's environmental policy.

In addition, we also determined the main directions of formation of costs associated with environmental activities, on the basis of which the main directions of cost management, their systematization and the creation of an analytical accounting mechanism were determined (Fig. 3).

Figure 3: Directions of formation of costs associated with environmental activities.

Company standards Education system	Information Support	Environmental rating for companies
Mechanisms (financial, economic)	Environmental effective company activity	Optimal existing technologies

Qualified specialists; legal advice; environmental management and audit	A thorough analysis of the experience of introducing environmental protection of modern new equipment and efficient technologies	Regulatory and legal framework
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The cost of environmental protection measures that are allocated on the basis of an economic production attribute has certain features: they are not embodied in the released goods, so an increase in such costs does not lead to production growth, and their absence does not cause a decrease in output. Therefore, these costs are rationalized.

It should be noted that the data on environmental costs are not formed separately in the company's accounting, but are reflected in the areas of economic elements in standard cost groups. Separate figures on environmental costs can be obtained only from the results of calculations with the budget for environmental payments, respectively, on the credit of account 68 Calculations on fees and taxes (GERASIMOVA, 2018; KUTINOVA, 2014; NGUYEN & IGNAT, 2018). However, just like other costs, environmental costs need to be carried out at the enterprise valuation and quantification,

analysis and tracking of their movement and condition, which is not possible without a systematic and full account of these costs (Fig. 4).

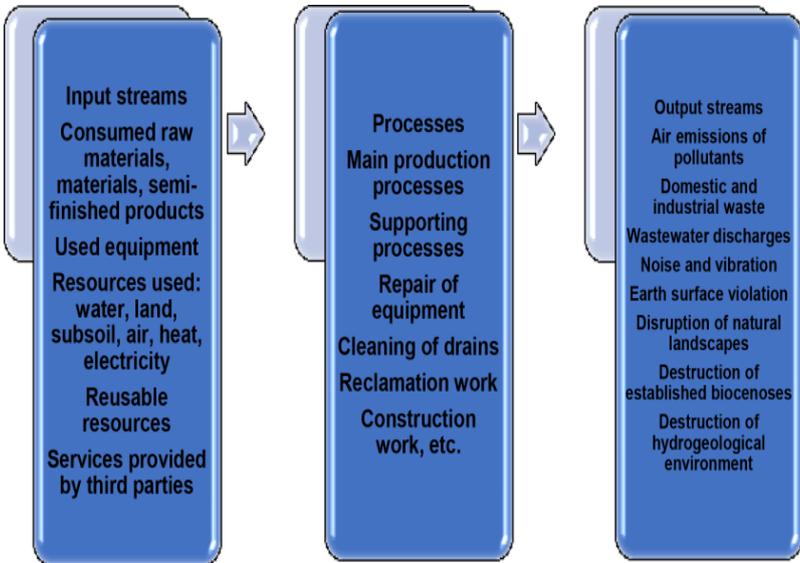


Figure 4: The process approach of identifying environmental aspects.

In this regard, it is advisable to develop a mechanism that allows you to manage costs in management accounting and will include all the conditions required for accounting: accuracy, efficiency and quality of accounting data.

In this interpretation, the relevance of using the cost accounting of a construction organization within the

categories of business process-function proposed by us is obvious when, in connection with the intersection of functions and business processes in general, costs acquire certain functions.

This ensures the creation of high-quality accounting information on the formation of environmental expenditures and their results.

For example, for a construction company use:

A: business processes:

- 1) production;
- 2) the distribution of indirect costs;
- 3) management;

B: functions:

- 1) government regulation of the construction business;
- 2) legal support of business processes;
- 3) construction greening;
- 4) environmental protection measures;
- 5) energy internal and external audit.

The formation of functional blocks on the example of the business process Production can have the following options:

- production - legal support;
- production - government regulation;
- production - greening construction;
- production - environmental protection measures;
- production - energy internal and external audit.

If necessary, it also becomes possible to detail the main functions by regions and individual categories.

We believe it is quite reasonable to divide the costs of environmental focus into two functional groups:

1) greening construction, which implies an assessment of the effectiveness of an environmental nature (GOST R ISO 14031-2001). Greening construction serves as a tool to enable environmental performance assessment and to form an optimal environmental policy in the company. Ecological passport (based on GOST 17.0.0.00-2000). Allows you to select the priority of financial investments (optimal investment programs);

2) the costs of environmental activities that are allocated to the implementation of environmental actions (limiting the number of discharges and emissions of waste, standardization of MPC of various hazardous substances, limiting the amount of production waste, the level of MPC emissions and emissions of harmful substances). Such events for construction companies should be held at least 1 time per year.

The application of the process-functional accounting method of environmental costs requires a detailed allocation of costs for analytical accounting purposes, allowing these costs to be presented as part of the company's total costs for direct, related to the execution of environmental protection measures, as well as indirect, including the amount of economic losses, which is inevitable in those companies that experience the negative effects of pollution.

On the basis of the Procedure for financing environmental protection measures at the expense of finances allocated from the federal budget, all environmental protection costs are classified as follows:

- costs of the company, dedicated to conduct environmental research experimental work;
- payments for excess and regulatory discharges and emissions of pollutants;
- payments for the use of natural resources;
- payments for used loans aimed at environmental activities;
- payments for violations of environmental legislation.

It should also be noted that on the basis of the Regulation on Accounting 24/2011 of the Russian Federation Accounting for the costs of developing natural resources, all activities carried out in order to improve the natural environment, as well as the costs associated with this activity. On the one hand, it seems possible considered as the construction of environmental complexes, and on the other hand - in the role of exploitation of these complexes.

Based on the above, we can identify a group that will include costs directly aimed at reducing the negative impact on the environment. These costs include:

- formation of special sanitary protection zones;

➤ processes responsible for the purification of air and process water, identifying cleaner sources from which water can be taken for production needs;

Costs of adaptation of various household funds to the direct effects of various chemicals (for example, to corrosion processes).

In addition, in the process of developing the systematization of environmental costs, it is necessary to proceed from the general structure of these costs in terms of average indicators of large companies in the region under consideration (TIMONINA, 2016).

Figure 5 shows an illustrative example of the structure of current environmental costs in terms of average indicators of large construction corporations for the Moscow region.

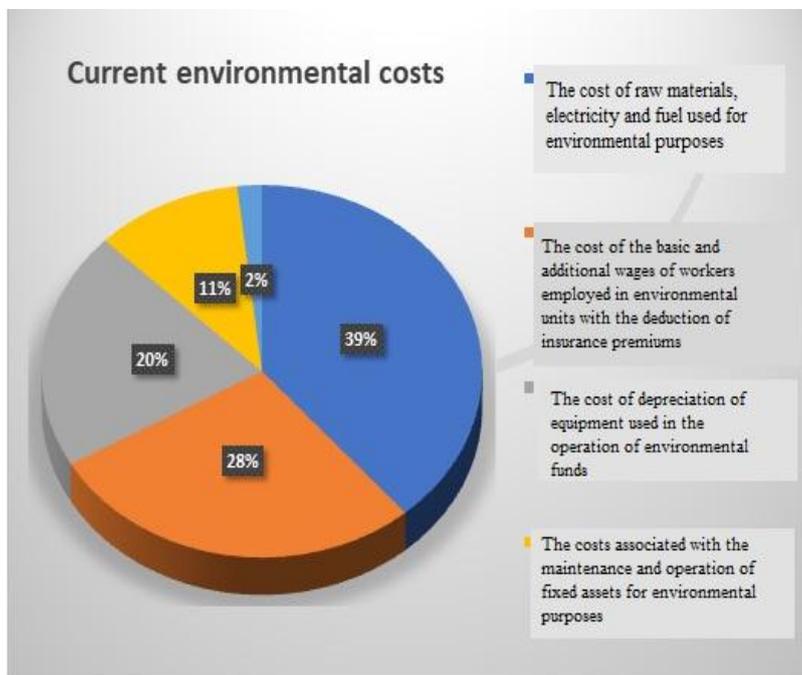


Figure 5: Structure of current expenditures of environmental nature on the average indicators of large construction corporations in the region of Moscow region

In the process of developing a more detailed classification for analytical accounting purposes, it is necessary to make decisions on these issues:

- Formation of a cost reservation system for environmental protection measures;

- Creation of analytical accounting of costs for environmental protection measures;
- Creation of uniform forms of internal reporting of the company on the costs incurred for environmental protection measures.

It is worth noting that such decisions are closely interrelated with the creation of timely, accurate and reliable data on environmental costs. Therefore, they should be drawn up as separate elements of the company's accounting policies.

Thus, the separation of environmental costs fully allows you to select the main objects of accounting activities of the organization in the field of nature conservation, which in turn allows the use of a mechanism for managing these costs in the methodology of functional and process cost accounting. Therefore, we believe that such a proposed classification is necessary in order to isolate environmental expenditures in the total amount of budget financing that is required to reduce the negative impact on the natural environment.

In an organization, from the point of view of management accounting, internal processes are capable of fixing themselves for the effect of any one of the categories

mentioned above (the function of the process is revealed). In a similar section, the accounting of all environmental protection costs at an enterprise can be carried out according to a structural breakdown (if the activity of the structural unit is taken as a process). Thus, in the context of accounting and analytical provision, the mechanism for creating management information reflects the main property of costs - to perform the generalized functions of processes and costs.

Similarly, in the framework of ensuring the activities of the bulk of the processes (internal) aimed at achieving any effects from this category, there are costs that are aimed at acquiring the effects of all cross-categories. Taking into account the intersection of business processes and functions, costs are allocated for individual functional blocks.

Thus, costs are identified by functional units and main processes, for example, variable direct costs of producing one unit of a product; unallocated costs; costs that are subject to primary distribution (the acquisition of a licensed program for the purpose of management accounting refers to general business expenses, which must be fully allocated to the management process).

4. DISCUSSION

We believe that the most optimal is the approach in which there is a fairly limited list of costs necessary for environmental protection measures. All this greatly simplifies the task of creating comparable data. If a company needs separate accounting for environmental costs, in such cases local documentation is developed and approved (the company's internal accounting standards). For such standards, recommendations and guidelines developed by accounting professional organizations (non-profit) can serve as a quality base.

Thus, economic entities must independently identify the qualifying features of environmental protection costs and their functional capabilities. It is necessary to build an effective system in management accounting, which is able to provide all accounting results of actual costs incurred for environmental activities and will allow generating reliable, real-world information.

5. CONCLUSION

Based on the study, we can come to the following conclusions:

1. One of the main criteria for the effectiveness of the analytical accounting mechanism of a company today is the adequacy of this provision to the existing management systems.

As a result of the design, it is necessary to take into account possible environmental consequences when making a certain decision. The environmental approach should reflect the construction, design, and operation of the structure. This approach should be maintained with constructive and space-planning decisions; in the selection of building materials for the construction of the building, determining the optimal technology for the construction of buildings, etc.

The improper organization, work and ill-conceived technologies entail enormous costs of materials and energy and lead to severe pollution of the natural environment. In this

vein, the object of management accounting with primary informational importance is the cost of environmental protection, formed under the influence of threats from the outside. However, there are no scientifically sound ways to identify these costs and to ensure their accounting and control.

2. Following the results, a methodical approach was developed to determine the typology of environmental protection expenditures, based on the relationship between the categories of business process-function; the stages of setting up a cost accounting for environmental protection with the aim of fulfilling the indicators of effective budgets are highlighted.

3. The grouping, the general structure and the main functions of environmental protection costs provide quite reliable information on the actual costs incurred for environmental protection activities. In addition, the recommended methodology for the functional and process accounting of environmental protection costs fully complies with the established norms for the formation of effective systems, being accessible and

useful for making and considering various kinds of management decisions that are aimed at the economical and purposeful use of finance in the environmental performance of companies.

4. The proposed methodology for accounting for environmental expenditures in its entirety will make it possible to revise approaches to the method of tracking data that are directly related to an increase in the parameters of the work of construction corporations. To establish the relationship between all target values, critical areas of activity, required expenditures, as well as expectations from management decision making; significantly improve the processes of formation of the company's financial sustainability strategy in the conditions of constant competition.

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