

- (б) для установления близости данных;
- (в) для понимания общей структуры данных;
- (г) для дальнейшей обработки определенного кластера и уточнения модели для дальнейшего анализа.

Метод преобразования *Data Mining Educational* был использован в педагогических целях. Интеллектуальная обработка анкетных данных позволила получить общее видение/оценку курса студентами разделив их на кластеры, что не позволяет получить обычная статистическая обработка. Общая оценка курса студентами позитивная, положительная.

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## INDUSTRIAL WASTE ACCOUNTING AT LIFE-CYCLE STAGES IN THE CONCEPT OF “GREEN” ECONOMY

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**Abstract.** *“Green” economy in conditions of instability of natural resources rational use and environmental degradation, becomes an extremely relevant and also is considered as one of the most meaningful goals for sustainable development. Industrial waste accounting at life-cycle stages, in its’ turn, as a component of “green” economy, poses certain challenges to the existing accounting system. At present, there is no comprehensive accounting system for industrial waste that would find the solutions to the problems posed by “green” economy. That fact determines the relevance of the research topic. The purpose of this research is to identify industrial waste as an object of accounting at life-cycle stages. Among the methods used in the study, one can single out synthesis, analysis, comparison, logical generalization, inference by analogy, classification.*

**Keywords:** *green economy, recycling, waste management.*

In the Republic of Belarus, according to the National Action Plan for the Development of a Green Economy in the Republic of Belarus, a number of unresolved interrelated environmental and economic problems were identified. One of the most pressing problems is the accumulation of waste [1]. The problem of waste accumulation in the Republic of Belarus is primarily due to an increase in the volume of production waste, while the volume of waste used remains approximately at the same level and accounts for only a quarter of the total volume of production waste generated, which is confirmed by statistical data on education. , use and disposal of production wastes [2].

The largest share of industrial waste generated in the Republic of Belarus falls on industrial waste. This fact is confirmed by data on the formation of production waste by type of economic activity. So, in 2016 and 2017. the volume of industrial waste amounted to 42,900.1 thousand tons and 47,855.3 thousand tons, respectively, which is 86.76% and 86.2% of the total volume of industrial waste generated [2].

Thus, the process of intensive accumulation of industrial waste, a decrease in the interest of manufacturers in solving the problem of waste management due to the unstable economic situation, the problem of using industrial waste (among which hazardous waste predominating that damages the environment), the amount of which makes up the bulk of the total volume of industrial waste contribute to environmental degradation and depletion of mineral resources in the Republic of Belarus.

The priority areas for environmental protection, rational use of natural resources and environmental safety in the Republic of Belarus are:

1. reduction of the volume of waste generation;
2. sustainable consumption and production;
3. maximum involvement of waste in civilian circulation as secondary raw materials;
4. prevention of harmful effects of waste on the environment [1, 3, 4, 5, 6].

For the Republic of Belarus, within the framework of the designated priority areas, the most urgent problem is the formation, disposal and use of industrial waste, since they account for about 86% of the total volume of waste generated.

To implement the above-mentioned priority areas, industrial waste management system is needed in the Republic of Belarus, which will allow considering industrial waste as objects of management of the economic and environmental safety of industrial enterprises.

In the world practice of waste management, a waste management system is becoming widespread, considering the processes of generation, use and disposal of waste in an integrated manner. In the Republic of Belarus, there is no systematic approach to industrial waste management and the organization of economic and environmental safety of industrial enterprises.

A necessary factor in the development of rational and efficient use of resources, sustainable consumption and production, and a waste management system at the microeconomic level is the availability of integrated accounting for industrial waste.

The study showed that the existing accounting system in the Republic of Belarus does not generate comprehensive information about waste from the moment of its occurrence until the end of its existence. Waste as objects of accounting does not go through all stages of the technological cycle of waste, from the moment of its occurrence and ending with its disposal. Information about waste at all stages of the waste technological cycle is blurred between different accounting objects: recyclable waste, secondary material resources, secondary raw materials and a by-product.

In this regard, we can say that at the present stage, the accounting system does not form the basis for providing a full assessment of the effectiveness of the implementation of the principles of the "green" economy in the Republic of Belarus and does not allow solving the problems posed by the "green" economy.

Therefore, to solve this problem, a significantly new approach to accounting is required, which will consist in the formation of information about industrial waste throughout the entire length of their life cycle (from the moment of their formation to the moment of their disposal).

To solve the indicated problems at the first stage, it is necessary:

1. Highlight the stages of the life cycle of industrial waste for accounting purposes;
2. Identify industrial waste as an accounting object and their economic essence at the stages of the life cycle.

For accounting purposes, it is necessary to consider the stages of the life cycle of

industrial waste as a waste management process, starting with the formation of industrial waste and ending with their disposal.

In domestic, foreign economic and environmental literature, the stages of the life cycle are considered with varying degrees of detail. The following stages of the life cycle of industrial waste can be distinguished, which have a significant impact on their accounting system:

- I. Occurrence of industrial waste;
- II. Collection and / or accumulation of industrial waste;
- III. Recycling of industrial waste;
  - III.1 Preparation for the use of industrial waste;
  - III.2 Storage of industrial waste;
  - III.3 Use of industrial waste;
- IV. Burial (destruction) of industrial waste.

The next stage is the identification of a single accounting object and the determination of its economic essence throughout the entire process of the stages of the life cycle of industrial waste.

The existing system of accounting for waste in the Republic of Belarus today assumes only partial reflection of information on the generated, used and buried waste. So, it was previously indicated that waste as accounting objects does not go through all stages of the life cycle. This is due to the fact that after collection and / or accumulation, waste is recognized as secondary material resources, which, after being prepared for use, are classified as secondary raw materials. After the temporary storage of secondary raw materials at the stage of use, another accounting object is allocated - recyclable waste. By-products, in turn, are identified as waste.

All of the above confirms the absence of an integrated system of accounting for industrial waste. Considering the above, a new accounting object - industrial waste - is needed to solve the above-mentioned problems and to create a more comprehensive accounting system.

The lack of interpretation of industrial waste as accounting objects in the regulatory legal acts of the Republic of Belarus and foreign countries, as well as in the special economic literature, determined the need to identify the characteristic features of the definition of "industrial waste" as a new accounting object. So, on the basis of the studied principles of ecological and economic accounting of waste, approaches to the preparation of financial statements in accordance with GRI standards, the requirements of the international system of national accounts, the new accounting object "industrial waste" was assigned the following criteria:

- 1) economic resources that have completely or partially lost their consumer properties;
- 2) organizations formed in the course of production activities, but are not the goal of the production process;
- 3) subject to valuation.

Thus, industrial waste that meets the criteria for asset recognition will be included in the accounting for industrial waste. Industrial waste as a new object of accounting at the stages of the life cycle will be an important element in the construction of an integrated system of accounting for industrial waste.

Thus, in the course of the study, for the construction of an integrated accounting system for industrial waste, it was identified:

- 1) Stages of the life cycle of industrial waste for accounting purposes;
- 2) A new object of accounting at the stages of the life cycle - industrial waste.

A significant trend in the reform of the accounting system is the perceived need to include information on the generated and disposed industrial waste. This is due to the need to

manage the economic and environmental safety of industrial enterprises in the context of the principles of the "green" economy in the Republic of Belarus.

A study of the theory and practice of industrial waste management showed that today there are several problems in the waste accounting system:

1. Assessment of industrial waste;
2. The impossibility of forming complex information about the generated and disposed industrial waste.

In the Republic of Belarus, waste assessment is carried out in two types: quantitative and cost assessment.

The difficulty in quantifying is that it is often necessary to adjust the amount of waste due to waste and surplus in the waste management process, which entails changes in valuation, which, as a result, affects the accounting system.

A study of waste management practices in the Republic of Belarus showed that a cost-based valuation type is used for waste, while there is no assessment of the economic potential of waste based on current market value. This leads to the fact that the product obtained as a result of waste processing, assessed by the cost method, cannot be sold on the market, which leads to a constant accumulation of the volume of generated waste at enterprises. The constantly growing volume of waste that cannot be sold on the market with coverage of the costs incurred has not only a negative impact on the environment, but also entails the transfer of waste at zero cost for recycling to other enterprises, which causes enormous damage to business entities. and the state as a whole.

As a result, in the balance sheet of enterprises of the Republic of Belarus, waste is reflected in the composition of objects estimated only at actual costs, which leads to a distortion and a decrease in the information value of the indicators of the accounting (financial) statements, the results of the analysis of economic activities and complicates their interpretation.

The current situation does not allow presenting information on waste for interested users in two aspects: on the cost of waste management - on the cost of environmental protection and on the economic potential of waste, which does not provide an information base for the relevant areas of analysis.

To take into account the relationship between the indicators of industrial waste management and the performance of the enterprise, we propose a model for reflecting industrial waste in the accounting (financial) statements, in accordance with which the accounting of industrial waste is organized in two estimates: at actual costs and at the current market value.

This makes it possible to present information on industrial waste for interested users in two aspects: on the cost of environmental protection measures and on the economic potential of industrial waste used, which provides an information base for the relevant areas of analysis.

The second problem is the fact that the existing accounting system in the Republic of Belarus does not form complex and interrelated information about the generated and disposed industrial waste from the moment of its occurrence until the end of its existence.

In international practice, waste is considered to be linked to the waste life cycle, which is a sequence of waste management processes in the period from their appearance (at the stages of the product life cycle), certification, collection, sorting, transportation, storage (storage), including disposal and / or burial (destruction) of waste, until the end of their existence [7,8].

However, it should be noted that waste as accounting objects does not go through all stages of the waste life cycle, starting from the moment of its occurrence and ending with its disposal (use / disposal). This fact is due to the fact that information on waste at all stages of the waste life cycle is blurred between various accounting objects, such as recyclable waste,

secondary material resources, secondary raw materials and by-product. So, after collection and / or accumulation, recyclable waste is recognized as secondary material resources, which, after being prepared for use, are reflected as secondary raw materials. By-products, in turn, are identified as waste.

Thus, the lack of a systemic connection between the objects of waste accounting and the waste life cycle in practice leads to:

1. Impossibility of constructing primary, analytical and synthetic accounting of industrial waste;

2. Impossibility of forming complex information about the generated waste, used industrial waste (specifics of processing various types of waste), buried waste, starting from the moment of its occurrence and ending with its disposal;

3. The impossibility of assessing the ongoing measures for industrial waste management;

4. Impossibility of making competent management decisions on industrial waste management;

5. Impossibility to reduce the volume of industrial waste generation, sustainable consumption and production, to maximize the involvement of waste in civil circulation as a secondary raw material, to prevent the harmful effects of waste on the environment.

The absence in the balance sheet of enterprises of comprehensive information about the generated industrial waste, waste to be disposed of, as well as operations carried out to protect and restore the environment, not only distorts information about the resource, economic and technological potential of enterprises, but also does not ensure the integration of the accounting system with the system of national accounts. The shortage, unreliability and inconsistency of information on industrial waste negatively affect the attractiveness of the Republic of Belarus for the inflow of investments.

Thus, we can say that at the present stage, the existing accounting system is insufficiently systematized and does not form the information base necessary to ensure a full and comprehensive assessment of the effectiveness of the implementation of the principles of the "green" economy in the Republic of Belarus, and also does not allow solving problems that puts the "green" economy.

In this regard, to solve the above problems, a new approach in accounting is required, which will contribute to the formation of an information base on the generated and disposed industrial waste, from the moment of their formation to the moment of their disposal, in order to manage the economic and environmental safety of industrial enterprises in the context of green economy principles.

### **Conclusions**

From the standpoint of the formation of comprehensive information on industrial waste in accounting, it is necessary to consider industrial waste as an object of accounting throughout the entire process of handling industrial waste for each stage of the waste life cycle, which will allow:

1. Subsequently, to reflect comprehensive information about the generated industrial waste, waste to be disposed of, as well as operations carried out to protect, restore or manage the environment in the reporting of enterprises;

2. Conduct a reliable assessment of the impact on the environment for various methods of industrial waste disposal along the stages of the life cycle of industrial waste in order to determine the priority areas of such use;

3. To develop proposals for improving industrial waste recycling system in order to introduce environmentally friendly and cost-effective technologies for the disposal of industrial waste;

4. Develop recommendations for the sustainable use of natural resources;

5. Ensure the operation of enterprises on ecological "green" principles, which imply the reduction of risks to the environment and the prevention of depletion of its components while ensuring the planned growth of production.

The results obtained will further contribute to the development of methodological recommendations for the assessment, documentation, synthetic and analytical accounting of industrial waste in the context of the use of environmental technologies for their processing and disposal, taking into account industry specific features.

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## ПРОБЛЕМЫ И МЕТОДОЛОГИЧЕСКИЕ ПРИНЦИПЫ ОРГАНИЗАЦИИ БУХГАЛТЕРСКОГО УПРАВЛЕНЧЕСКОГО УЧЕТА ЗАТРАТ В ПЧЕЛОВОДСТВЕ

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***Abstract.** To date, beekeeping in the Republic of Belarus is inefficient in the presence of favorable natural and climatic conditions. In connection with the strengthening of the role of management accounting in improving the efficiency of beekeeping farms, the requirements for information generated in the accounting system of production costs are changing: accounting data acquire a managerial emphasis. The article reveals the shortcomings of the current practice of cost accounting and calculating the cost of beekeeping products at all stages of the production process. The author has developed and substantiated the methodological principles of reforming the accounting system used in beekeeping and the formation of information in primary accounting documents. Their use in the accounting practice of beekeeping farms will ensure that interested parties receive reliable and complete accounting and analytical information about the costs and products of beekeeping.*

***Keywords:** beekeeping, costs, management accounting, methodological principles.*