

Towards an Approach to Improve an Environmental Management System in Industrial Organization

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Abstract: The article presents an approach to improve an implemented environmental management system in industrial organization based on the self-assessment using a methodology in terms of specifying the level of maturity through such model of environmental management systems, based on ISO 14001 as a factor for development of a sustainable development of organizations from the mineral raw materials industry in Bulgaria. A practical application of the methodology in "Kaolin" EAD - a leader in the "Industrial Minerals" sector is presented. The described methodology ensures an opportunity to the interested parties of the company which operates in an environmentally friendly way that annually have to assess the current level of maturity and proposes actions that will lead to the sustainable development of its activity

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1. Introduction

An industry is a group of enterprises, which operate in a particular business field. Manufacturing industry is divided into two major groups– extractive and producing [1, 2].

The extractive industry operates with extraction of fuel, minerals and other natural materials from the Earth's subsurface, while the producing industry consists of enterprises engaged in their processing.

Part of the extractive industry is the mineral industry. It covers the extraction of ore and industrial minerals.

The mineral industry of the Republic of Bulgaria is a structurally established industry and is one of the main drivers of economic development through increasing the consumption of raw materials from the domestic market and the production of finalized products with high added value [3]. The mining industry develops through efficient, complex and long-term utilization of underground resources in accordance with the requirements for sustainable development, covering the three main aspects: economic, environmental - green mining industry, corporate social responsibility.

This industry has a direct impact on nature - it changes entire landscapes, ecosystems and habitats. At the same time, it has great potential - to reclaim land, to positively impact the ecological status of large areas and populations of valuable species. It ranks among the most significant polluters of water and soil, and generates hazardous and recyclable waste and rock. Soil and water quality protection and proper waste management are a top

priority for achieving sustainable development.

The goal of the article is to outline an approach to environmental management system improvement, applying self-assessment using an environmental management system maturity model as a factor for achieving sustainable development of organizations in the mineral industry in Bulgaria. An application of the Methodology for this self-assessment in an organization from the Industrial Minerals sector is presented.

2. Towards an environmental management system

Objective of any organization is to achieve sustainable development in a complex and dynamic environment. In order to achieve it securely, senior management strives to meet the needs and expectations of all stakeholders. In addition, the drive is aimed at systematically improving the overall performance of the organization, which includes to plan, implement, analyse, evaluate and improve an efficient and effective management system [4].

The Environmental Management System (EMS) covers the organisational structure, planning activities, responsibilities, procedures, processes and resources for the development, implementation, enforcement, evaluation of the environmental policy [5]. The implementation of an EMS according to ISO 14001 is voluntary and demonstrates an organisation's concern for reducing pollution by controlling the impacts it has on the environment through its activities, products and services. ISO 14001 helps to develop a framework for an organisation's overall approach to the environment by requiring the company to define its environmental policy and objectives and the procedures that support them.



Implementing and certifying an Environmental Management System allows organizations to manage their environmental issues, leading to better environmental performance, as well as minimizing the risk of environmental incidents and their consequences [6].

The overall environmental performance of mining industry organisations is better managed through the development and implementation of an Environmental Management System in accordance with ISO 14001 [7].

Part of the minerals industry is the Industrial Minerals Sector. The leader in this sector is the company Kaolin EAD. It has implemented and operates an environmental management system in accordance with BDS EN ISO 14001:2015.

The development, implementation and operation of the Environmental Management System through the application of a systematic approach aims to achieve the following objectives:

- to establish an appropriate environmental policy;
- to ensure, relevant to the companies' production activities and products and environmental aspects, scope and content of the Environmental Management System
- to achieve and maintain compliance with all applicable national and local environmental requirements;
- to achieve good environmental performance through supervised activities, products or services, taking into account environmental objectives and policy;
- to prioritise and set reasonable, achievable and economically viable environmental goals and targets as an element of the organisation's Business Plan and investment programmes;
- to continuously improve environmental management practice (EMP) by carrying out

systematic inspections and implementing corrective and preventive actions, and consider changing circumstances.

The elements of the Environmental Management System of Kaolin EAD are shown in Figure 1. It demonstrates the approach on which the environmental management system is based - Plan-Do-Check-Act (PDCA) concept. The PDCA model provides an iterative process that is used by the organisation for continuous improvement. It includes:

- Planning: defines environmental objectives and the processes required to achieve them in accordance with the organisation's environmental policy;
- Implementation: implementation of processes as planned;
- Verification: monitoring and measuring processes against environmental policy and targets and reporting results;
- Action: take action for continuous improvement.

The figure represents premises of BDS EN ISO 14001:2015 and the respective steps of the PDCA model.

Step one, 'planning' identifies the organization's context, environmental policy and objectives, environmental aspects, compliance obligations, and action planning to achieve environmental objectives.

Step two 'implementation' includes sustainment and activities such as resource identification, competency, awareness, information sharing, documented information, and emergency preparedness and response capability.

Third step 'verification' performs evaluation - observation, measurement, analysis and evaluation; internal audit and management review.

Fourth step 'action' continuously improves the suitability, adequacy and effectiveness of the environmental management system.

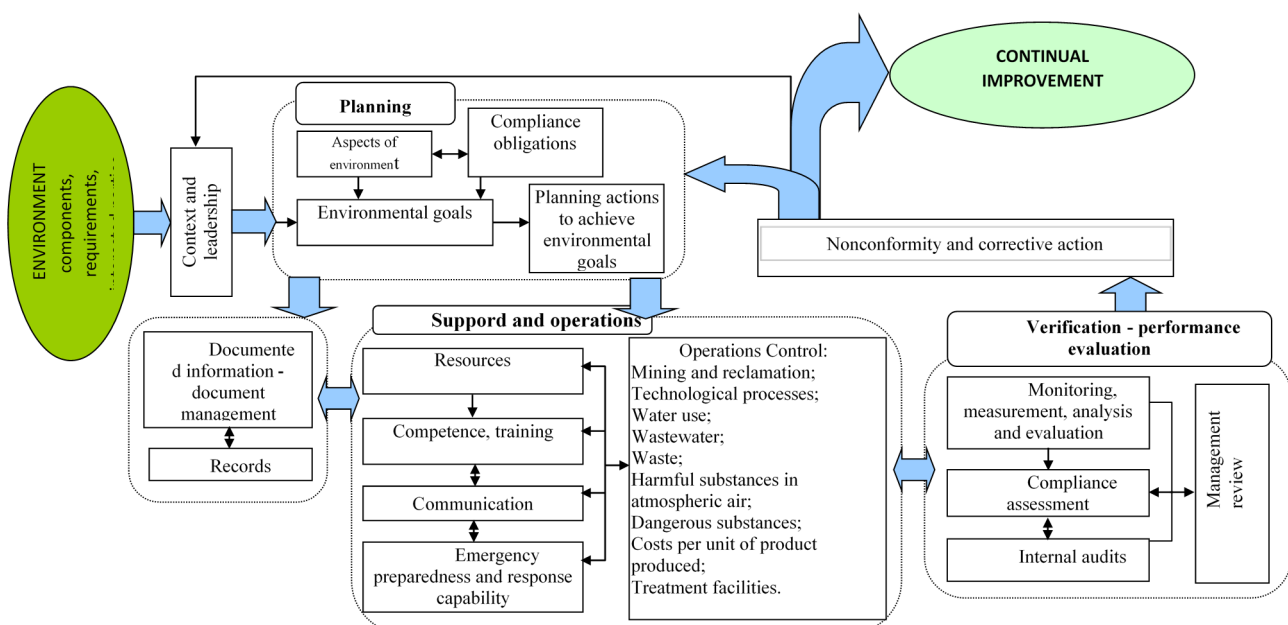


Fig. 1. Elements of the Environmental Management System.

Kaolin EAD continuously improves the suitability, adequacy and effectiveness of its environmental management system to enhance environmental performance. The organisation takes into account the results of the analysis and assessment, as well as the outputs from the management review, and determines whether there are needs or opportunities that should be addressed as part of continuous improvement.

Evidence of this continuous improvement is the methodology developed and implemented at Kaolin EAD for self-assessment of the Environmental Management System using a maturity model as a factor for achieving sustainable success.

3. Methodology for self-assessment of the environmental management system using a maturity model

Currently, there is a quality management system maturity model developed according to ISO 9004:2018 that provides guidance and addresses the ability of organizations to achieve sustainability. No maturity model has been developed for environmental management systems.

Self-assessment through an environmental management system maturity model enables organisations to review their performance against defined criteria, establish their current levels of maturity, identify their strengths and weaknesses and the associated risks and opportunities for improvement.

Babekova et. al. in [8] proposed a methodology for self-assessment by determining the maturity level of the environmental management system according to ISO 14001:2015, which was applied in Kaolin EAD, a company of Industrial Minerals sector.

In addition, Babekova N. [9] has developed and proposed an algorithm of the process of self-assessment, presented by a scheme and explained in detail the steps of the process, making its implementation easier and accessible.

The organization has developed a procedure that describes the self-assessment process.

Self-assessment is based on expert judgement. The competence and weight of the expertise of each member of the self-assessment team is determined according to certain criteria presented in a check-list.

The team of experts has carried out the assessment and determined the maturity level by assessing the fulfilment of the specified criteria. The data are presented in tabular form.

After establishing the current level of maturity, areas for improvement have been identified and 22 proposals have been prepared to complete the environmental improvement plan [10]. This report has been presented to senior management for the purpose of input to Clause 9 "Performance Evaluation" Section 9.3 "Management Review".

Following the review of the EMS, senior management has approved 16 of the suggestions for improvement, which include: activities to reduce electricity consumption; water treatment; reduce air pollution; reduce negative consequences in the event of an

emergency with a negative impact on the environment; conduct training; update documents, motivate employees to contribute to improving the performance of the environmental management system. Proposals for EMS improvement adopted by senior management become part of the planned environmental targets for 2022.

To complete the overall cycle of the self-assessment methodology, an evaluation of effectiveness was carried out - the extent to which the planned activities were implemented and the intended results achieved.

The results of the one-year cycle of activities under the EMS self-assessment methodology and the performance achieved shall be presented to auditors from the certifying organisation. Any positive assessment by them, indicated in the audit report as good practice, will contribute to the company's image through the ISO 14001 certificate issued. By holding this certificate, the organisation guarantees to all stakeholders that:

- the EMS operates in compliance with all ISO 14001 and regulatory requirements,
- Everyone working in the company is trained and competent to perform their assigned tasks flawlessly;
- the conditions in which work is carried out meet European environmental requirements;
- the selection of suppliers, subcontractors and partners is based on the required criteria
- each part of the activities is strategically specified and planned;
- every aspect aims to reduce the environmental impact;
- accurately identifies and manages risk and opportunities associated with environmental aspects.

4. Conclusion

The self-assessment, through an environmental management system maturity model, enabled Kaolin EAD to establish its current level of maturity, review and complement its strengths and weaknesses and associated risks and opportunities for improvement.

The application of the Self-Assessment Methodology of Kaolin EAD is a reviewing tool of the sustainable success level, the company has reached.

The introduction and implementation of the self-assessment methodology is a management decision aimed at protecting the environment, which improves the company's image and supports the sustainable development and better financial results.

Company's reputation is an intangible asset and a subject to annual evaluation. Such assets can yield a profit above the market return rates, as the business is worth much more than net tangible assets. The capitalised value of this excess return is economic reputation.

The methodology is used as a self-assessment tool of the company's sustainable success. The results of the Methodology increase the confidence of all stakeholders and the organisation:

- assesses annually the current level of maturity and proposes actions dedicate to

improve it with focus to sustainable development of its operations;

- it operates in an environmentally friendly manner and implements an effective environmental management system, not only meeting all the requirements of the BDS EN ISO 14001 standard and regulatory requirements, but also striving for continuous improvement of the system.

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