

IMPLEMENTATION OF CERTIFIED MANAGEMENT SYSTEMS IN MINING COMPANIES

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ABSTRACT. The article presents the results of an empirical research conducted among 65 companies in the mining sector in all sub-sectors – Production of metal minerals, Production of non-metal minerals, Production of oil and gas, Coal mining, Production of inert and construction materials, Production of tiling materials, Geology, Construction and Logistics. The study focuses on reflecting quality management in the Bulgarian mining industry and identifies how ISO 9001, ISO 14001 and OHSAS 18001 certification affects safe working conditions and the environment. The new ISO 45001:2018 Occupational Health and Safety Management System, which will replace the existing OHSAS 18001, is also presented.

Keywords: certified management systems; ISO 9001; ISO 14001; OHSAS 18001; ISO 45001; mining companies.

ПРИЛАГАНЕ НА СЕРТИФИЦИРАНИТЕ СИСТЕМИ ЗА УПРАВЛЕНИЕ В МИННИТЕ КОМПАНИИ

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РЕЗЮМЕ. Статията представя резултатите от емпирично изследване, проведено сред 65 компании от минерално-суровинния отрасъл, включително всички подотрасли – добив на метални полезни изкопаеми, добив на неметални полезни изкопаеми, добив на нефт и газ, въгледобив, добив на инертни и строителни материали, добив на скалооблицовъчни материали, геология, строителство и логистика. Проучването е насочено към изучаване влиянието на сертифициращите системи за управление в българската минна промишленост и установяване как сертифицирането по ISO 9001, ISO 14001 и OHSAS 18001 влияе върху безопасните условия на труд и околната среда. Представен е и новият стандарт ISO 45001:2018 "Системи за управление на здравето и безопасността при работа", който ще замени досегашния OHSAS 18001.

Ключови думи: сертифицирани системи за управление; ISO 9001; ISO 14001; OHSAS 18001; ISO 45001; минни компании.

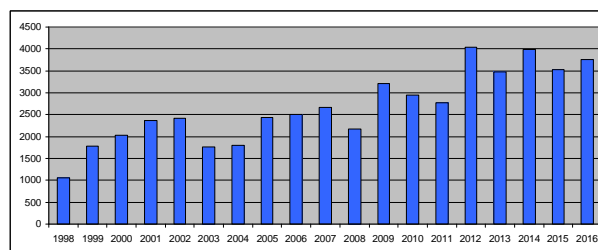
Introduction

The specificity of the mining industry requires significant investments in the production activity in order to implement strategic programs for development and implementation of high-efficiency technologies and innovations. Corporate programs of mining companies to improve the quality and productivity and reduce the cost of the final product are an expression of their drive for sustainable development. Implementation of modern integrated information systems for business process management, new dispatching systems for management of mining activities and ensuring continuity of processes, etc. are in line with the current requirements for an optimal financial, economic and management model for the company. All this, and the continuous search for ways to satisfy all stakeholders - from employees in enterprises, through local communities, to the environment - are a prerequisite for quality management strategies, which is already a business practice in favor of a gradual positive impact on organizations. A growing trend is the ever-increasing expectations of stakeholders.

Quality management systems, environment and occupational health and safety working conditions

The concern of mining companies for stakeholders is also driven by the growing number of certificates in the quality management system. ISO 9001 is the most widely used

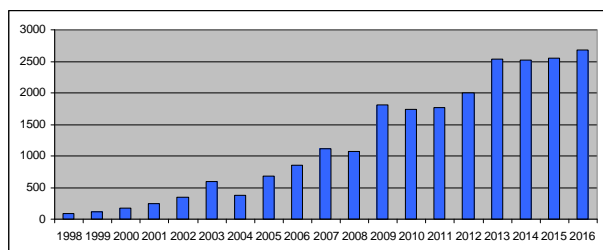
international standard for management systems. It defines the requirements when an organization has to demonstrate its ability to deliver a product consistent with the requirements of the customer and the requirements of the applicable regulations and seeks to increase the satisfaction of stakeholders through efficient application of the system. Worldwide, in the past few years, the mining industry has ranked 11th in ISO 9001 certification, according to the reports of the International Organization for Standardization. The trend shows that globally, the number of mining companies certified by ISO 9001 is growing (Graph 1).



Graph 1. Worldwide mine companies certified under ISO 9001 "Quality Management Systems", according to the International Organization for Standardization.

At the same time, socially responsible mining companies are implementing large-scale environmental projects to increase environmental safety and quality of life by introducing new techniques and technologies for environmental protection and

its components. Soil, water and air protection activities, treatment plants and permanent monitoring on the territory of the ecological field, etc. in the framework of Environmental Programs require annual investments due to the impact of this industry on the environment. The latter are present in the annual financial statements of the companies concerned. ISO 14001 certification "Environmental Management Systems" is even more impressive than ISO 9001. The standard is recognized by organizations that seek to manage their environmental responsibilities in a systematic way, contributing to the environmental pillar of sustainability. Over the past 20 years, more and more mining organizations have been opened up to the environmental management system, although the trend has continued in recent years (Graph 2).



Graph 2. World Mining Companies certified by ISO 14001 "Environmental Management Systems", according to the International Organization for Standardization.

Bulgarian mining companies are not far from this trend - most of them deploy more than one management system, namely the "System of environmental management" ISO 14001, as well as "Occupational Health and Safety Assessment Series" OHSAS 18001. It is designed to meet the industry's need for a recognized standard for a health and safety management system that can be assessed and certified externally. Investments in health and safety, voluntary group health insurance, personal protective equipment, reducing dust and emissions in the work environment, preventing accidents and damage of the workers' health, training on health and safety at work, systematic risk assessment and application of standards, etc. are of utmost importance to these businesses and are well-placed in the Safe and Healthy Workplace Safeguards Programs.

On March 12, 2018 ISO 45001 "Occupational health and safety" was published, which supersedes OHSAS 18001, and turns into ISO standard for management systems in health and safety at work. This is a new, globally agreed standard, using an established structure based on an effective management model and designed to be used as part of a business management system. Moreover, the new ISO 45001 structure will be extremely easy to integrate with the new versions of ISO 9001 and ISO 14001. The migration period for transition planning of this new standard is three years. "Dundee Precious Metals" JSC is already working successfully on ISO 45001.

Methodology of empirical research

The purpose of the empirical study is to determine the extent to which mining companies apply management systems. The collection of the most comprehensive information on the extent to which mining practices are perceived and applied by the respective enterprises in the country necessitates clarification

of some specificities related to the geographic scope, the sample size, the respondents and the timing of the survey.

Table 1.

Technical records of the conducted survey

Characteristics	Survey
Population	Mining organizations
Geographic scope	Bulgaria
Sample size	65 enterprises from the mining industry
Timing of field work	1 April – 31 May 2018 г.
Respondent	Department /Manager Quality Management

The survey was conducted among 65 enterprises, which are characterized by Production of metal minerals, Production of non-metal minerals, Production of oil and gas, Coal mining, Production of inert and construction materials, Production of tiling materials, Geology, Construction and Logistics. The companies have a national status and actively work in the mining industry on the territory of the Republic of Bulgaria.

Results obtained from the conducted survey

Out of the surveyed 65 enterprises, four refused to join the survey or created some barriers to providing information.

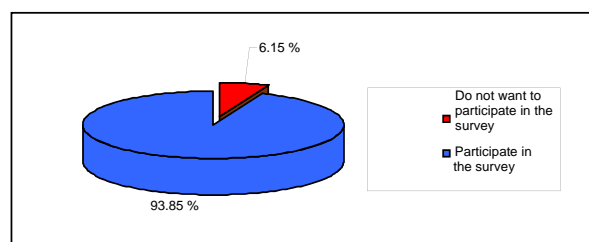


Table 2. Number of certificates in the surveyed companies

Certificates	Number of companies	%
ISO 9001	12	18.45
ISO 14001	4	6.15
ISO 9001 + 14001	5	7.70
ISO 9001 + 18001	2	3.07
ISO 9001 + 14001 + 18001	24	37.00
Without certificate	14	21.50

Table 2 shows the percentage of certified and non-certified companies in the sub-sectors of the mining industry. There are still organizations that do not use certifications because "it is not required by the state". 21.5% of all mining companies surveyed do not implement any certificate.

Largely, the sample shows a positive attitude by the companies towards the quality of processes management and certification of the different quality management systems, environment and health and safety conditions. Most of the mining companies surveyed initially overlapped the ISO 9001 requirements, and most of them continue to improve their ISO standards on environment and health and safety at work.

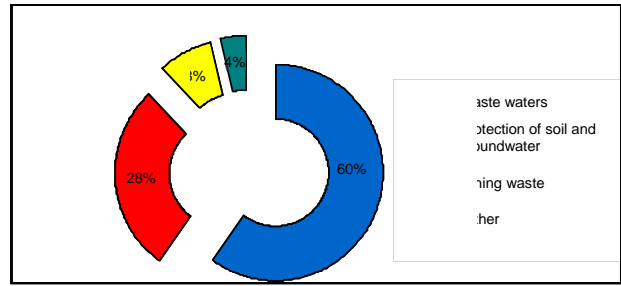
Table 3 illustrates the companies surveyed by sub-sector. Sub-sector "Production of metal minerals" has the largest number of enterprises surveyed, almost all certified. In sub-sector "Geology" most companies work without certificates (50%).

Table 3
Empirical survey conducted by sub-sector

	Production of metal minerals	Production of non-metal minerals	Production of oil and gas	Coal mining	Production of inert and construction materials	Production of tiling materials	Geology	Construction companies	Logistics
Studied	18	7	3	5	7	5	10	6	4
Did not participate in the survey	0	2	0	1	0	1	0	0	0
ISO 9001	4	0	0	0	1	0	1	4	2
ISO 14001	2	0	0	2	0	0	0	0	0
ISO 9001 + 14001	1	1	0	0	1	1	1	0	0
ISO 9001 + 18001	1	0	1	0	0	0	0	0	0
ISO 9001 + 14001 + 18001	8	3	1	1	4	1	3	2	1
Without certificate	2	1	1	1	1	2	5	0	1

Environmental Management System

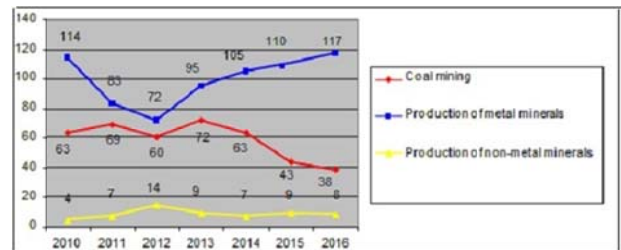
Over the last decade, environmental protection and restoration costs are relatively constant. In their structure, wastewater costs account for the largest share, followed by protection of soil and groundwater and waste. Other costs related to air, noise, forests, etc. occupy a very small share. Serious attitude of the enterprises in the industry could be considered as a reference to ISO 14001 certification. Out of the 65 companies surveyed, more than half cover the Environmental Management System, four of which have implemented only this system in their work.



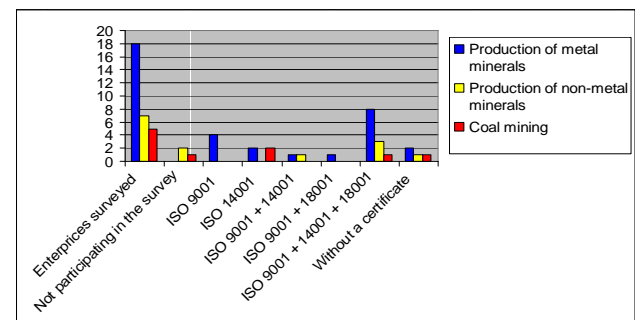
Graph 3. Distribution of environmental costs, according to a sample of the National Statistical Institute (2008-2017).

System for safe working and health conditions

The mineral-raw material industry is associated with significant risks to the safety and health of workers in the sector, despite the serious technical and technological renewal in recent years of the hazardous and labor-intensive processes in the industry. The data of the Bulgarian Chamber of Mining and Geology (BCMG) show a tendency towards a sharp reduction in the number of fatal accidents in the industry. According to a study of BCMG, labor accidents in the sub-sector "Production of metal minerals" predominate, as the years gone by even increase. In the "Coal mining" sub-sector, the trend is for permanent reduction of the number of accidents. In "Production of non-metal minerals", labor accidents are significantly less, and the tendency has remained stable over the years (Graph 4).



Graph 4. Number of accidents on an annual basis, according to the National Statistical Institute in sub-sectors "Coal mining", "Production of metal minerals" and "Production of non-metal minerals".



Graph 5. Number of certified and non-certified companies in the sub-sectors "Coal mining", "Production of metal minerals" and "Production of non-metal minerals".

In the study, the enterprises of the subsector "Production of metal minerals", which is also characterized by many labor accidents, have been most thoroughly studied. The impression is that the sub-sector is aware of the problem and almost all enterprises are certified. Out of the 18 companies surveyed, 8 have all three quality certificates, 8 recognize one or two systems, and only 2 of them are not certified under any of the management systems. There is a lack of statistics on the reduction of occupational accidents in companies following the implementation of these standards.

Conclusion

The analysis of the factual information from the survey shows the conscious readiness of most mining companies in Bulgaria to be certified in quality management, environment and safety and health at work. The introduction of certified systems harmonises all manufacturing activity, makes services more efficient and confers confidence to stakeholders that its operation is safe and environmentally friendly. Business executives are increasingly convinced that continuous improvement in quality is the most vital strategy for the company's success.

The study focuses mainly on quality management systems, environment and occupational health and safety. In the

process of gathering information from the companies, some of them have reported that they are in certification procedures including ISO 50001 "Energy Management Systems", which is the most importance for the mining industry.

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