

## INTEGRATED QUALITY MANAGEMENT SYSTEM IMPLEMENTED IN A MINE

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### SUMMARY

*The overall objective of an integrated management system is customer satisfaction of product quality as well as environmental protection and work safety. The quality of product affects the price paid for coal mines' products, and finally influences financial results of the mine.*

*In the article, the author presents the results of the tests carried out on one of the Polish mines that evaluated employees' judgments concerning effectiveness of integrated management system implemented in the mine. As a result of the study, author describes employees' perception of the system and analyzes how it affects the quality of their work.*

**Keywords:** integrated management system, mining, employees' perception

### 1. INTRODUCTION

The increased operational effectiveness in market economy is conditioned by the widespread use of economic calculation, which allows comparing the obtained effects with the expenditure. The challenge faced by contemporary enterprises is to guarantee the effective satisfaction of customers' changing needs. This applies to all aspects of an enterprise activities, also the ones related to quality.

The idea behind the project is to create a system which, irrespective of the origin and culture of a country, will make a product meet highest quality standards. For this reason, no matter where an enterprise operates or where a product comes from, if it has an ISO marking, it fulfils not only international but also customers' requirements. Moreover, a recipient is sure that the aim of the enterprise is to improve itself and its products.

In the year 2010 the biggest mining enterprise in Europe – Kompania Węglowa S.A. in Katowice introduced the Integrated Management System (IMS).

Kompania Węglowa S.A. started its economic activity on 1<sup>st</sup> February 2003. It was established by 23 mines which had been previously functioning in five different coal companies. Apart from mines, the structure of Kompania Węglowa S.A. included specialist plants providing technical base.

### 2. INTEGRATED MANAGEMENT SYSTEM IN KOMPANIA WĘGLOWA S.A.

The primary aim of IMS in a mine is to ensure product quality that will satisfy customers as well as taking care of the environment and work safety. In the case of mines (and not only) the quality of a product translates directly into the prices, and in consequence the financial result of a company. The identified environmental aspects determine adequate environmental

programmes, and the results of studies into quality and customer satisfaction define the activities related to the mission on the market.

The management of Kompania Węglowa S.A. undertakes its activities in line with the latest management methods. The aim of these activities is to obtain lasting stabilization as the biggest producer of hard coal in Europe. The company also makes sure that its production activity (mining) takes place in the conditions which protect the natural environment.

The goals of the IMS in Kompania Węglowa S.A. result from the established and communicated IMS policy, identified environmental aspects and objectives related to OSH, including major identified hazards, as well as the current needs of the Owner, i.e. the State Treasury. Objectives for particular processes are defined in the Process Book as well as in the Technical-Economic Plan and Operational Plan specific for a given mining plant (mine).

The Management System policy reflects the main aims of the activity of Kompania Węglowa S.A. – it is available on its website ([www.kwsa.pl](http://www.kwsa.pl)).

### 3. EVALUATION OF IMS FUNCTIONING IN THE MINE

The IMS in the mine was evaluated on the basis of the results of a survey carried out among the employees, and on the basis of analysis of internal audit reports.

#### 3.1. Surveys

Surveys were carried out among a group of 90 employees. The surveyed were randomly selected from the staff. The questionnaire was delivered to the training department of the mine, where it was completed by the employees. This 90-person group consisted of 50 people working overground and 40 underground workers.

*Table 1. Characteristics of the respondents*

Criteria of selection	Specification	Number of respondents		Share of respondents	
		underground employees	surface employees	underground employees	surface employees
Sex	Female	0	28	0	56
	Male	40	22	100	44
Age	< 25 years	9	14	22	28
	25-40 years	15	10	38	20
	41-50 years	14	14	35	28
	> 50 years	2	12	5	24
Education	Primary	1	0	3	0
	Vocational	25	38	62	76
	High-school	14	12	35	24
	University degree, related to mining	0	0	0	0
	University degree, not related to mining	0	0	0	0
Working experience	< 5 years	13	16	33	32
	6-10 years	2	0	4	0
	11-15 years	0	0	0	0
	16-20 years	12	8	30	16
	> 21 years	13	26	33	52
Position	Underground Worker	38	44	95	88
	Surface Worker	0	0	0	0
	Underground Non-Worker	2	0	5	0
	Surface Non-Worker	0	6	0	12

The aim of the survey was to obtain answers to many questions related to IMS, in particular the following:

- are mine employees aware of the existence of IMS in their workplace?
- do employees observe the rules laid down in this system?
- are the employees aware of the usefulness of IMS?

The characteristics of the surveyed persons falling into 2 categories – the overground and underground workers, has been presented in Table 1.

**3.2. Analysis of the survey results (selected problems)**

The analysis of the survey results was carried out for the questions which indicate the employees’ knowledge (or its lack) related to IMS implemented and functioning in the mine.

The main question concerned the implementation of IMS – were the employees aware of its existence? The answers of both overground and underground workers were similar – the vast majority are aware that the mine has IMS (fig. 1 and 2). What may worry, however, is the fact that 20% of the underground workers claim firmly that the IMS has not been implemented in the mine, whereas 2% give “I don’t know” answer. The “no” answer was absent in the case of the overground employees, while the percentage of “I don’t know” was also high (28%). The above replies prove the insufficient flow of information between the managing staff and the employees.

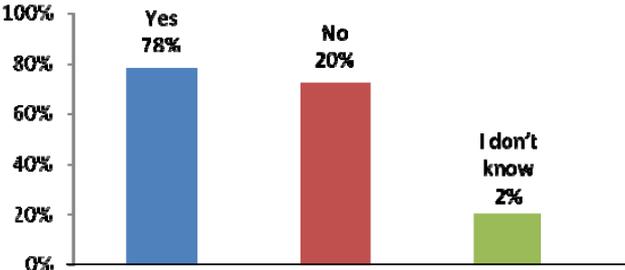


Figure 1. Knowledge about implementation of IMS – underground employees

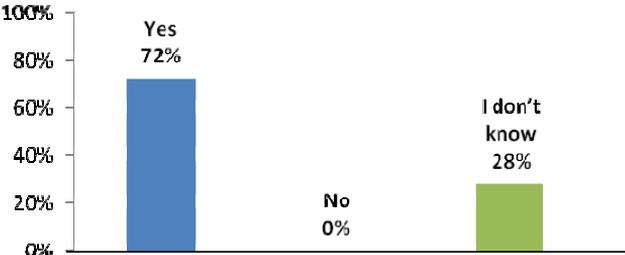


Figure 2. Knowledge about implementation of IMS – surface employees

The next question concerned the elements of IMS. The distribution of answers given by particular groups of respondents is shown in figures 3 and 4. Among all the respondents only 7 people marked correct answers, ticking all the systems as the elements of IMS. They included 5 underground and 2 overground employees. This confirms the insufficient flow of information between the managing staff and the employees. The underground workers have greater knowledge – 12% gave correct answers, ticking all three elements of IMS.

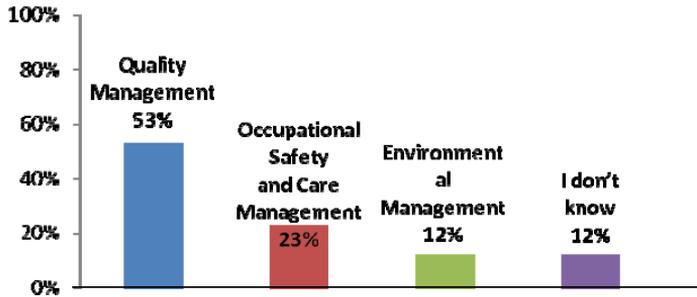


Figure 3. Elements of IMS – underground employees

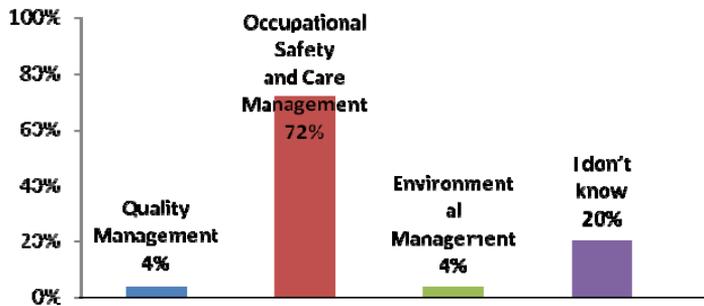


Figure 4. Elements of IMS – surface employees

Another question concerned the benefits for the mine resulting from the implementation of IMS. The answers have been presented in figures 5 and 6. This question was answered positively by the vast majority of overground employees (52%), while the percentage for the underground workers was 40%. Also, “it’s hard to say” answers were similar – 47% in the group of underground workers, and 44% in the group of overground employees. On the other hand, the percentage of “no” answers was much higher among the overground employees – 13% versus 4% of the underground workers.

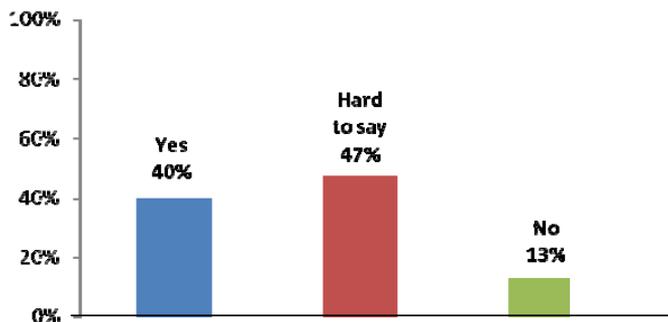


Figure 5. Perception of benefits from functioning of IMS – underground employees

The respondents gave very different replies to the question concerning the functions fulfilled by IMS. The results have been presented in figures 7 and 8. The vast majority of the underground workers (63%) could not give clear answers to this question.

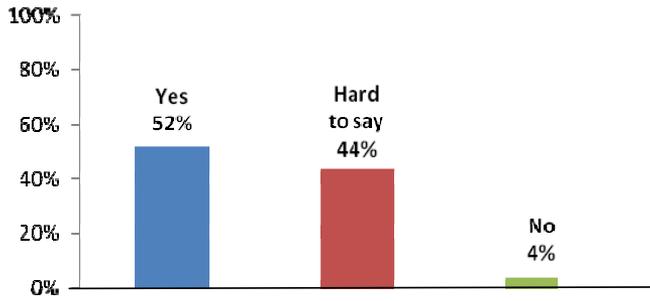


Figure 6. Perception of benefits from functioning of IMS – surface employees

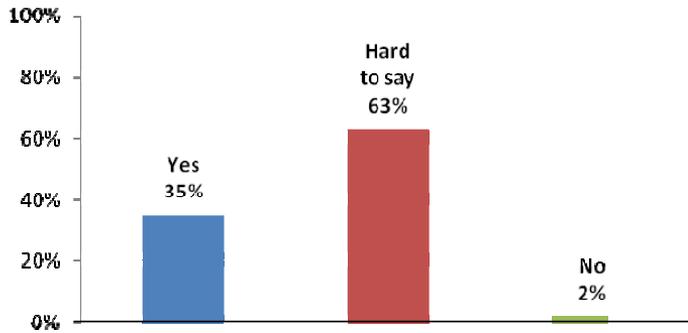


Figure 7. Meeting the requirements by IMS – underground employees

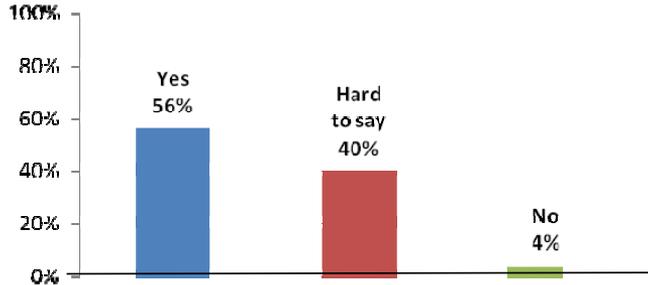


Figure 8. Meeting the requirements by IMS – surface employees

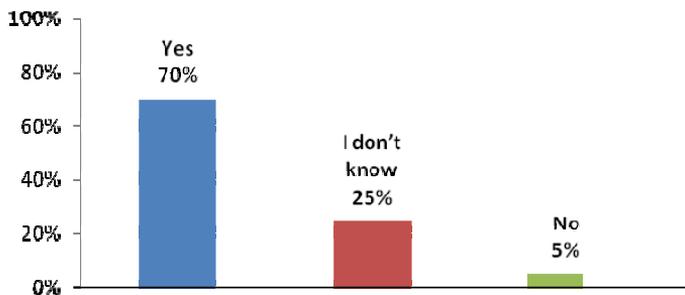


Figure 9. Internal audits – underground employees

Little more than 1/3 answered positively (35%), whereas 2% of the respondents gave “no” answers. In the case of the overground employees the answers were as follows:

- 56% gave positive answers,
- 40% of the respondents had no opinion on the subject,
- 4% gave negative answers.

One of the questions referred to internal audits. The survey results indicate that a considerable number of persons filling in the questionnaire replied positively. Among the underground workers 70% gave positive answers, while the percentage for the overground employees reached 60%. The “no” answers were similar:

- among the underground workers – 5%,
- among the overground employees – 4%.

The results for both groups of employees have been presented in figures 9 and 10.

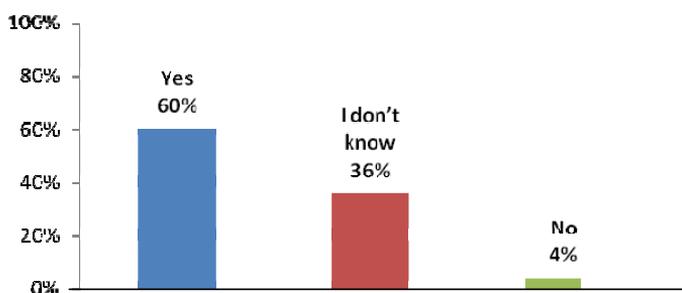


Figure 10. Internal audits – surface employees

#### 4. SUMMARY

The conducted studies show that the employees are aware of the existence of IMS in the mine. However, they do not have a full knowledge on the elements of this system. The benefits of the implemented system are noticed by nearly half of the employees, whereas a very low percentage claim that the implementation of IMS has streamlined their work. The problem related to the insufficient knowledge of IMS may be solved mainly by trainings. Training courses should make the employees aware of the goals, functions and principles of IMS functioning. Moreover, training courses should also convey the information that the mine employees have an active influence on the creation and functioning of the system. On the other hand, a very high percentage of surveyed workers know of internal audits' existence. It is curious that the underground workers have a greater knowledge in this area (70%), whereas the percentage of positive answers among the overground employees is 60%.

#### 5. REFERENCES

- [1] Kończak G.: Metody statystyczne w sterowaniu jakością produkcji. Wydawnictwo Akademii Ekonomicznej w Katowicach. Katowice 2007.
- [2] Hamrol A.: Zarządzanie jakością z przykładami. Wydawnictwo Naukowe PWN Warszawa 2008.
- [3] Białowas P.: Efektywne wdrażanie Zintegrowanych Systemów Zarządzania. Problemy Jakości 08/2006 (s. 50) Wydawnictwo SIGMA-NOT Sp. z o. o. Warszawa 2006.
- [4] Chudzik A.: Ocena funkcjonowania Zintegrowanego Systemu Zarządzania na przykładzie Kompani Węglowej. Praca dyplomowa inżynierska. Rybnik 2010.
- [5] [www.kwsa.pl](http://www.kwsa.pl)