Z E S Z Y T Y N A U K O W E P O L I T E C H N I K I P O Z N A Ń S K I E J
Nr 65 Organizacja i Zarządzanie 2015

Iwona ROMANOWSKA-SŁOMKA[*], Małgorzata PAPAŁA[*],
Izabela HORZELA[**]

EVALUATION OF MOTIVATION LEVEL FOR SAFE BEHAVIOR IN MINING PLANT EMPLOYEES

The issue of motivation to work in a safe manner is a very important problem in management theory. Motivation is the primary function of the management system, it encourages employees to adopt and implement the established goals. The aim of the study is to analyze and assess the level of motivation for safe behavior of employees of a mining plant. The survey was conducted among employees of the mine, with a participation of 100 people. The surveyed people were of different ages and have different seniority. An analysis of the survey shows: inappropriate or dangerous behavior of employees is frequently assessed by others as negative, but almost half of employees remain passive, ignoring the dangerous situation; a majority of employees respects only some provisions and principles of safety, some of the respondents do not comply with them at all; the reason for dangerous and risky behavior is to facilitate work for a timely execution of tasks. The most common motivational methods are measures of persuasion such as conversations with employees, suggestions, brochures, information about supervisors' requirements and goals and the mission of the company. In order to enforce appropriate behavior, punishment is being used more often than rewards. The results of the assessment of employees' level of motivation for safe behavior are not satisfactory. The research has shown that motivation of employees at the analyzed plant is at a low level.

Keywords: motivation, safety.

1. INTRODUCTION

Human errors are the cause of about 95% of accidents. Among the errors, 85% are the result of non-compliance with occupational safety and health, and only 15% are due to mistakes resulting from inattention, forgetfulness or ignorance [10].

[*] Wyższa Szkoła Zarządzania Ochroną Pracy w Katowicach.
[**] Akademia Obrony Narodowej Warszawa.

Performing tasks in a safe way requires proper training for employees and ensuring and maintaining a safe physical environment. Therefore, it is necessary to effectively influence the motivation for working safely. Management should strive to ensure that all employees perform subcontracted tasks in accordance with safety regulations, even in the total absence of control. If an employee feels the need to comply with regulations on ways of working and best practices, then the worker is motivated to safe behavior. The need for safe work results from the conviction that adherence to health and safety regulations reduces or eliminates the risk of loss of life or health. Proceeding in accordance with the applicable rules is perceived as a satisfactory symptom of professional competence. Influencing employees with the intention of having them feel the need for save behavior is called motivation for safe behavior [5, 8].

The aim of the study was to assess the motivation for safe behavior of workers in a mining plant.

The first task in motivating actions is to identify hazards and gain knowledge of errors leading to dangerous events, then relay to workers information about threats and committing possible errors. The next task is strengthening proper motivation for safe behavior and weakening the tendency to take risks [8, 9].

2. METHODS AND WAYS OF MOTIVATING TOWARDS SAFE BEHAVIOR

Motivation for safe behavior consists of promoting safe practices, giving a good example, giving workers realistic goals for realization, analyzing and discussing accidents at work and giving out rewards and punishments. The main objective assigned to the team and individual employees is performing tasks in accordance with applicable safety regulations. Before starting work, an employee should first examine the conditions of the working environment, identify risks and take necessary protective measures. A preventive action may be the introduction of safe methods of proceedings, the abandonment of risky proceedings and replacing them with those less hazardous. The achievement of goals should be noticed and rewarded by management. Another way of motivating towards safe behaviors is to promote safe practices. Human behavior is influenced by the surrounding situation, as well as one's competence, experience and attitude and that determines how one will proceed in a given situation. Attitudes determine psychological readiness for behavior consistent with their content. In order to shape such readiness, it is necessary for the sender to influence the attitudes of the recipient via a persuasive message. It is difficult to change an attitude and it is usually not permanent. Changing attitudes to those desired depends on the delivered message, method of transfer to the recipient, assessment of characteristics and intentions of the sender and

knowledge and characteristics of recipients. A change in attitude can influence the message containing new information for the recipient, attracting attention and showing benefits of the same change of attitude. The sender's information is evaluated positively if it is perceived as credible and competent and does not require a change in attitudes [1, 2, 3]. Each supervisor can have an impact on safety by organizing technical prevention, by communication, which increases awareness of supervisors and workers, and by giving a good example. These actions may manifest themselves in setting safety goals before production goals, striving for compliance with decisions and assessments, enforcing the established safety regulations and including safety issues in production management. Members of management and supervision, regardless of their functions, have to obey safety regulations. The fact that supervisors respect and comply with the rules, confirms employees' conviction that there is a need for safe behavior.

Therefore, security issues should be made an important and crucial component of production meetings and meetings with employees [4, 5, 9].

Another method to motivate employees towards safe proceedings is informing employees of accidents. Employees do not learn enough from the mistakes of others – while some lose their lives or health as a result of mistakes, others are performing work in the same manner as that which led to the accident. The consequences of accidents include not only loss of health or death, but also measurable economic losses. Each case should be thoroughly investigated, and the events which led to its occurrence should be specified. This requires more than a recognition of the fact that something was done against the rules. The knowledge gained in accident investigations should be communicated to employees. Descriptions of accidents, presented to employees during periodic training for self-diagnosis of the causes, teach them to predict the consequences of taking risks. It should be a widespread habit to give daily information to employees about the number of days of work in the plant without incident. Management and all employees in the plant should at least once a year be evaluated in terms of safety standards. The evaluation criteria are usually: accident rates, occupational morbidity, results of inspections, and fulfillment of goals and special achievements in the area of improving safety. The assessment includes the degree that employees fulfill their obligations related to safety goals. An evaluation of the plant and its management is performed by the board of directors or a superior institution. The evaluation of the plant's organizational units, supervising officers and workers is carried out by management or a safety committee. The results of the evaluation shall be recorded and taken into account during promotion. Everyone should be convinced that the condition for promotion is to achieve high scores on the safety assessment. A monthly or quarterly evaluation of departments may provide a basis for granting special awards for the best department, while high individual scores result in granting special awards or at least an honorable mention [1, 3, 4].

When presented with a choice between two behaviors, one of which can lead to an award and the second to a penalty, people choose the one which results in an award. Regularity forms the basis for stimulating safe behaviors and blocking behaviors which may lead to accidents. In safety management, rewards and punishments should be used. Safe behavior should be rewarded, accident rates in departments reduced and new secure solutions introduced. Behavior inconsistent with safety regulations should be punished before it leads to an accident. A common mistake is not noticing safe employee behaviors and not rewarding them, or late punishment for behavior that led to the accidents. The award is an indicator of what should be done in the future to once again receive an award. Awards accelerate learning of appropriate behaviors. Penalties block unwanted behavior often only for a short time. There is a lot of evidence that shows punishments do not teach anyone proper behavior. A sporadic reward is more effective than an automatic reward for each proper action. This rule does not apply to penalties. Penalties are more effective, the more inappropriate behaviors are punished, and the less bad behaviors remain unpunished. Effective means of controlling behavior provide feedback information about approval or disapproval of the proceedings and of progress made or the obtained results. Such information takes the form of a reprimand or praise. The effectiveness i.e. the influence of praise and reprimands depends on the content and form of transfer. Receiving rewards and praise from the management and supervising officers is the best encouragement to keep exhibiting safe behavior [9].

3. RESEARCH METHODOLOGY

3.1. Characteristics of the mining plant

The mining plant extracts coal from a deposit with a total surface area of 56,6 km^2. Size of operational reserves in relation to planned annual production allows the operation of a plant for decades. As in any mining plant, there are many threats. Natural hazards include the risk of fires and floods. The Department of Mining is one of the most flooded coal mines in Europe. The plant has implemented a safety management system, which ensures appropriate decision-making in relation to natural and technological threats.

3.2. Method of data collection

To assess the motivation level for safe behavior in mining plant employees a survey was conducted among a group of 100 employees. Employees worked at various positions and had varying levels of education. The survey consisted of 13 questions. There were no women among respondents.

4. RESULT ANALYSIS

One hundred people participated in the survey. The participants were of different ages, had a different education and work experiences. Table 1 shows the characteristics of the respondents.

Table.1. Characteristics of respondents

Age group	No. of persons	Seniority	Professional education	Secondary education	University education
18–25 years	15	Less than 5 years	2	10	3
26–30 years	17	8 persons up to 5 years		6	2
		9 persons 6–10 years	1	7	1
31–35 years	13	1 person less than 5 years	1		
		7 persons 6–10 years		6	1
		5 persons more than 10 years		4	1
36–40 years	25	4 persons 6–10 years	2	2	
		9 persons 11–15 years		9	
		10 persons 16–20 years	10		
		2 persons more than 21 years		1	1
41–45 years	14	4 persons 11–15 years	1	2	1
		5 persons 16–20 years	5		
		5 persons 21–25 years	3	2	
over 45 years*	16	6 persons 11–15 years	3		
		3 persons 16–20 years	4	2	
		5 persons 21–25 years		3	
		2 persons more than 25 years			1

* Four people did not reply to a question about education

Figure 1 shows the answer to the question: How do you act when you see that one of the collaborators acts dangerously?

In response to the first question, as many as 42 people, upon seeing a co-worker who acts dangerously, evaluate such behavior as negative and address the co-worker, 13 people evaluate such behavior as negative and ignore it, they do not take any action because they do not want to be poorly evaluated by colleagues. Out of 100 hundred respondents, 28 people ignore such behavior by claiming that it is not their business, 9 people evaluate dangerous behavior of a co-worker as a manifestation of high professional competence, 7 people would inform their supervisor about inappropriate behavior. Figure 2 shows the answer to the question: How do you assess the rules and safety regulations applied at your plant?

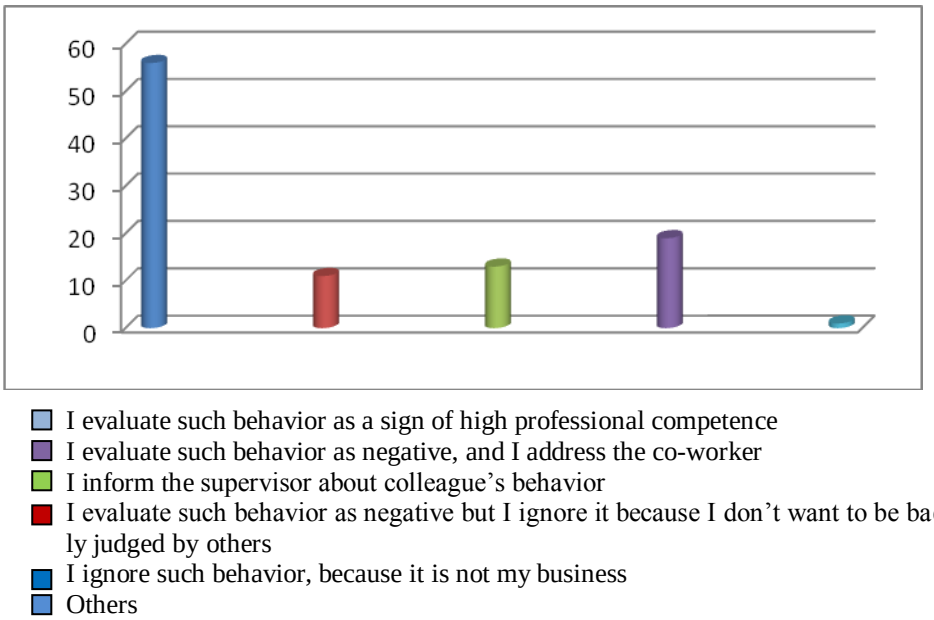

Fig. 1. How do you act when you see that one of the collaborators acts dangerously [7]

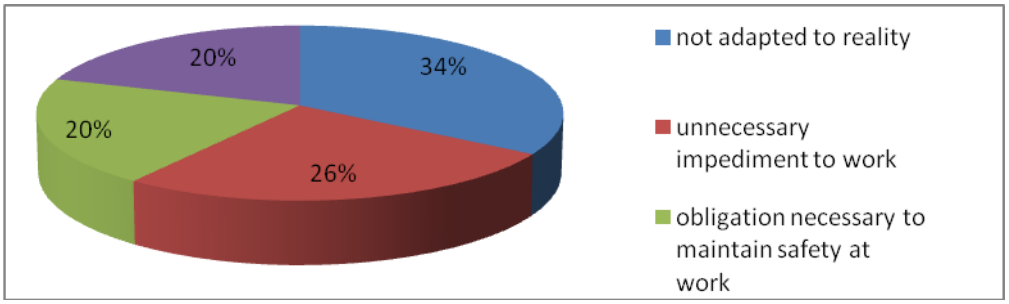

Fig. 2. How do you assess the rules and safety regulations applied at your plant? [7]

Assessing safety rules and regulations, 34% of respondents rated them as inadequate to the reality, 26% said that it is an unnecessary obligation which impedes their work and 20% of respondents said that it is an obligation, but it is necessary to maintain safety during work. Only 20% rated health and safety rules and regulations as a useful tool for ensuring safety.

Figure 3 shows the answer to the question: How often do you follow the rules and health and safety regulations?

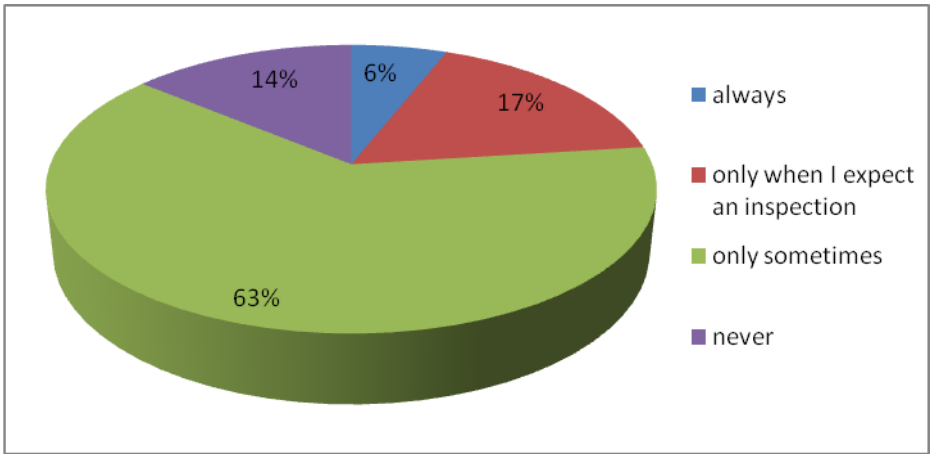

Fig. 3. How often do you follow the rules and health and safety regulations? [7]

To the question about the frequency of compliance with safety rules, the majority of employees responded that they obey only some of health and safety regulations. Only 6% of employees always complies with safety regulations. In contrast, 17% of respondents follow the rules only when they are expecting an inspection. Among the respondents there is also a group of people (14%), which does not comply with safety regulations.

To the question: "Have you ever acted hazardously?" up to 94% of employees responded affirmatively, while only 4% said that they did not.

Figure 4 shows the answers to the question: "Why do you act in a risky, dangerous manner, against health and safety regulations?".

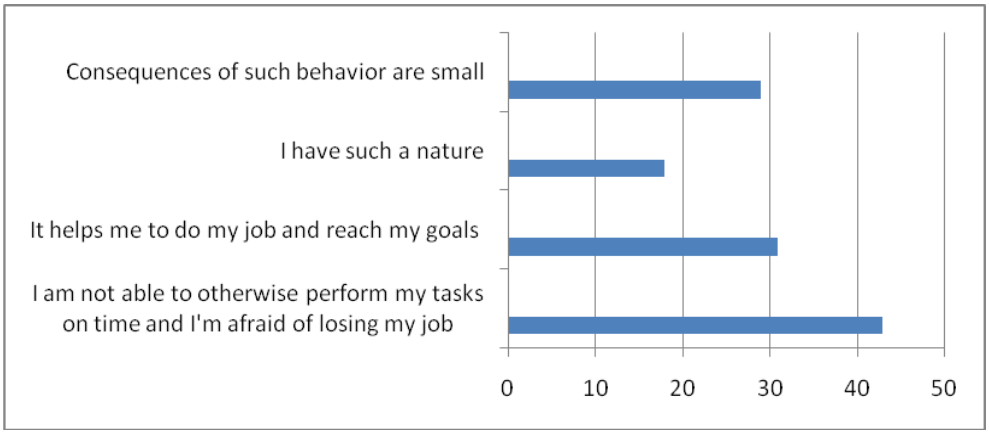

Fig. 4. Why do you act in a manner that is risky, dangerous, inconsistent with health and safety rules? [7]

Justifying dangerous and risky behavior, 43 people replied that they act like that because "they are not able to perform their tasks within a time limit and they are afraid of losing their jobs". While 18% of respondents behave dangerously because it is their nature, 19 respondents said that the consequences of such behavior are small. To the question "Do you wonder about possible consequences of an accident?" 69 respondents answered that they do not think about possible consequences of accidents. Figure 5 shows the answer to the question: "Which means of motivation are used most often in your plant?".

Fig. 5. Which of the motivation means are used most often in your plant? [7]

The most frequently used incentives include interviews with employees as well as posters, leaflets. Next in order are: joint setting of goals, orders, information about goals and mission, and instructions. Further measures include: higher wages and bonuses, additional specialized training, awards, possibility of advancement, praise. Measures such as: privileges, evaluation, points in general have not been checked by the respondents. Among three groups of incentives: coercion, incentives, persuasion mine executives most frequently use means of persuasion. Awards are extremely rare and usually are small bonuses or additional specialized training.

To the question "How do you assess the rewards offered by the employer in comparison with prizes of which you heard in another plant?" 54 people claimed that the rewards offered by the employer are more favorable in comparison with the rewards offered by other companies. To the question "Is used in your plant a monitoring system?' All of the respondents replied that in their plant is used monitoring system of work.

Answer to the question, "If in your plant worker performs his duties in violation of safety regulations, which measures are most often used?' is shown in Fig. 6.

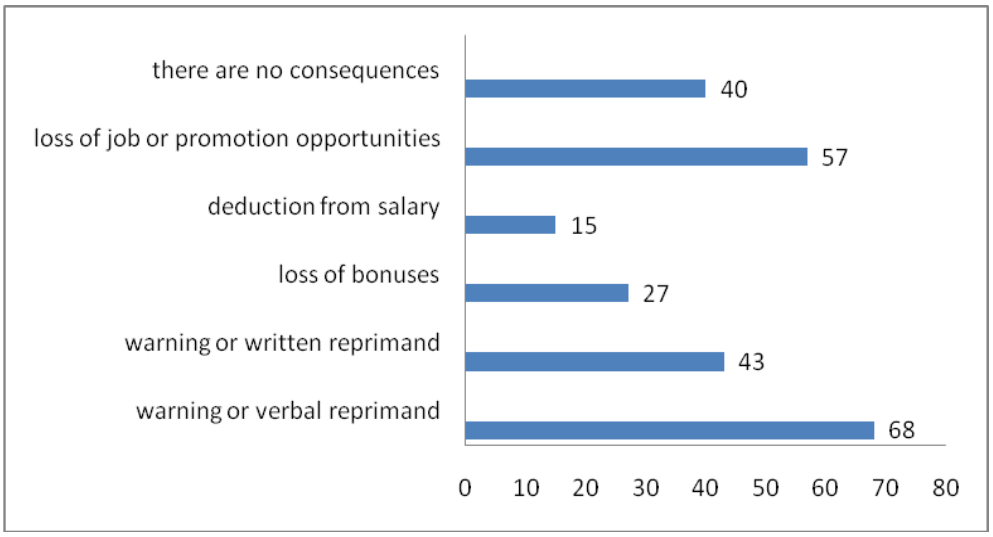

Fig. 6. If in your plant worker does his work in violation of safety rules and regulations, which measures are used most often? [7]

If an employee performs work in violation of safety rules, the most commonly used measures are sequentially: admonition or oral reprimand, loss of job or promotion opportunities, admonition or written reprimand. However, sometimes employees do not suffer any consequences. Very rarely, the employee may lose a bonus or the salary can be reduced.

In response to the question: "Are consequences of accidents at work discussed during health and safety training?" only 11 people answered yes. It can be concluded that the consequences are not discussed or are discussed briefly.

To the question: "Have you ever been rewarded for meeting the employer's expectations in the area of health and safety? If so, how?" 7 people answered that they had been awarded. The prize was a promotion or bonus.

To the question "Have you ever been punished for non-compliance with health and safety regulations? If so, for what and how?" 41 people said they were punished for non-compliance with health and safety regulations. These were mainly behaviors such as: willful leaving the place of work, not using protective clothing, being in unauthorized places. The penalties included: reprimand, loss of bonuses.

5. SUMMARY AND CONCLUSIONS

Motivating employees towards safe behavior contributes to an increase in work safety. In order for motivation to bring the intended effects, it must take into account the needs of people and hierarchy of their needs and should be based on a wide range of influence tools. When mine employees perceive inappropriate or dangerous behavior of other co-workers, they usually evaluate the behavior as negative, and address the employee. A part of respondents also evaluates negative behavior, but remains passive, ignoring dangerous situations because they do not want to be wrongly judged by co-workers. Some respondents said that it was none of their business and ignored it. Only a few people said they would alert their supervisor to the situation. Such attitudes testify that stereotypes still exist, that informing on the use of hazardous work methods is treated with denunciation, but it is a source of information necessary to properly target preventive activities. In addition, there is a significant lack of courage to inform about risky behaviors. Many times it results from the fear of losing jobs or spoiling relations with colleagues. Safety rules and regulations are evaluated by the staff of the analyzed plant as most often unsuited to the realities. Some also evaluate them as a constraint imposed by rules and impeding their job. Also, the majority of respondents break some rules and principles of health and safety and act dangerously. This is due to overstated plans imposed on workers of mines, which they have to accomplish in the designated time. They try to execute a plan so they often bypass the rules, expose themselves to danger so that it is easier, faster but not necessarily safe. To motivate employees to work safely, one should first change the attitude of people in managerial positions who tolerate unsafe behavior in the workplace and dictate too high standards for execution. It is also necessary to change the way of thinking of employees, shaping desired behavior, motivating employees to perform their work in a way which will protect their health and life. There are many different measures of motivation, which have a strong influence on the behavior of people in the workplace and they define their consciousness. Employees should be educated about the consequences in case of an accident, specifying the direct and indirect cause of the accident. The survey shows that only 31% of respondents wonder about the causes and consequences of accidents. To the question of why they behave dangerously, employees replied that they are not able to perform their tasks within the time limit and that the consequences of such behavior are minor. Meanwhile, it can be expected that the transfer of knowledge of severe and fatal accidents at work, and consequences of what they bring, can eliminate anomalies associated with excessive optimism or underestimation of the risk of inappropriate behavior. Employees usually assume that the negative effects of unsafe behavior at work relate only to others. Knowledge about the causes and consequences of accidents can be communicated during training. Meanwhile, studies have confirmed that during health and safety training carried out among employees of the mining plant these topics are

not discussed. Therefore, during training there should be more conversations about safe work and about causes and consequences of unsafe behavior. In the mining plant, penalties are used more often than awards as incentives. Other incentives used in the mining plant may include, for example: conversations with employees, brochures promoting safe behavior, the joint setting of goals. The management of the mine does not give out many awards. These are small bonuses or additional specialized training. If the employee violates safety regulations, the following are usually used: a warning and an oral or written reprimand, loss of job or promotion opportunities, loss of bonuses. Frightening with a dismissal from work is completely ineffective, raises frustration and aversion to the employer. From the survey it can also be inferred that in the mining industry penalties are being used more often than rewards. Among the respondents, only 5% were awarded and 41% said that they were punished. Penalties are mainly used for not following safety regulations, such as unauthorized leaving of work station, lack of use of protective clothing, being in unauthorized places. The penalties are admonition, reprimand, loss of bonuses. During motivating, the use of incentives is more effective than the use of coercive measures. Awards, though they are rarely used in the plant, are assessed by most respondents as beneficial in comparison with the rewards offered by other companies. Awarding of prizes at the plant is evaluated as fair.

1. The majority of employees complies only some of the provisions and rules of safety, some of respondents do not comply with them at all.
2. Inappropriate or dangerous behavior in the plant is most often assessed by employees as negative, but almost half of them remain passive ignoring the dangerous situation.
3. The rules and safety regulations are evaluated as a useful tool for ensuring safety only by a few employees; the majority evaluate them rather negatively, as an unnecessary constraint.
4. Almost all employees of the plant happen to proceed dangerously, and only some of them wonder about the possible consequences in case of an accident.
5. The reason for dangerous and risky behavior is the desire to facilitate work for a timely execution of tasks.
6. The most common incentives are means of persuasion, such as conversations with employees, suggestions, brochures, information about requirements and objectives of supervisors and the mission of the company.
7. In order to enforce proper behavior, the plant uses punishment more often than reward; these are admonitions, reprimands, loss of promotion opportunities and even work. Awards are rarely used; these are small premiums or additional specialized training; the reward system ensures fair distribution of prizes, awards are judged favorably as compared to other enterprises.
8. The results of the evaluation of motivation level for safe behavior of the employees are not satisfactory. Research has shown that the motivation of employees in the plant is at a low level.

9. A proper incentive system is still a long way away; especially since motivation in this case has to be primarily safety, not economic aspects. Proper attitude towards safe behavior should be rewarded and indicated as correct. In contrast, incorrect behavior should be severely punished – only in the situation when the attitude can be fixed.
10. When incorrect behavior and not complying with safety regulations is accepted at the plant, one cannot expect to foster correct attitudes; it is necessary to react quickly in all dangerous situations.
11. In addition to maintaining high labor discipline, the motivation system should be extended and the way of interacting with employees should be improved. Motivation for choosing safe behaviors is done by praise, increasing confidence and interactions in the workplace (meetings with employees to talk about safety). These forms should be used to make employees aware that their safety is the most important.
12. Creating safe working conditions and motivation for safe operation should be regarded not only as a fulfillment of a duty imposed by law on the employer, but also as a source of repayment of funds invested in safety.
13. The conducted survey shows that the motivation of workers towards safe behavior is low. Therefore, the plant should pay more attention to the ways of motivating and the methods used to increase the role of motivation in the pursuit of safe behavior.
14. The conducted surveys have shown that employees are not motivated to work safely and they do not respect health and safety regulations. Incentives are used in the mines, but they are not sufficiently effective. The plant should expand the motivation system and improve the way of interaction with employees. The plant should also work to change the attitudes of people in managerial positions who tolerate unsafe behavior in the workplace.

LITERATURE

[1] Jasiński Z., Motywowanie w przedsiębiorstwie, Placet, Warszawa 1998.
[2] Koradecka D., Nauka o pracy- bezpieczeństwo, higiena, ergonomia, czynniki psychologiczne i społeczne, CIOP, Warszawa 2000.
[3] Martyka J., Kulturowe uwarunkowania bezpieczeństwa pracy w górnictwie. Problemy bezpieczeństwa i ochrony zdrowia w polskim górnictwie, szkolenie, socjologia psychologia pracy − czynniki kształtujące bezpieczeństwo i higienę pracy, Mysłowice 2004.
[4] Niczyporuk Z., Przenniak W., Konsekwencje wypadków przy pracy elementem motywowania do bezpiecznych zachowań. Archiwum Górnictwa, Vol. 52, Wyd. Instytut Mechaniki Górotworu PAN Kraków 2007.
[5] Niczyporuk Z., Przenniak W., Motywowanie pracowników do bezpiecznych zachowań jako narzędzie prewencji wypadkowej, w: Zarządzanie Bezpieczeństwem i Hi-

gieną Pracy w Przedsiębiorstwie. Doskonalenie metod prewencji wypadkowej, V Krajowa Konferencja, Toruń 2006.
[6] Materiały źródłowe PKW S.A. ZG Sobieski, lata 2006–2009 r.
[7] Papała M., Ocena poziomu motywacji do bezpiecznego zachowania pracowników ZG Sobieski Praca końcowa. WSZOP Katowice, 2014, Promotor Romanowska–Słomka I.
[8] Pocztowski A., Zarządzanie zasobami ludzkimi, Kraków 1998.
[9] Reykowski J., Zasady motywowania kadr w przedsiębiorstwie, „Personel", 1998.
[10] Studenski R., Organizacja bezpiecznej pracy w przedsiębiorstwie, Wyd. Politechnika Śląska, Gliwice 1996.

OCENA POZIOMU MOTYWACJI DO BEZPIECZNEGO ZACHOWANIA PRACOWNIKÓW ZAKŁADU GÓRNICZEGO

Streszczenie

Kwestia motywacji do bezpiecznej pracy jest bardzo ważnym problemem w teorii zarządzania. Motywacja jest podstawową funkcją systemu zarządzania, zachęca pracowników do przyjęcia i wdrożenia przyjętych celów. Celem pracy jest analiza i ocena poziomu motywacji do bezpiecznego zachowania pracowników zakładu. Badanie zostało przeprowadzone wśród pracowników kopalni, a w badaniu wzięło udział 100 osób. Badani to osoby w różnym wieku i z różnym stażem pracy. Analiza wyników badania pokazała, że: nieodpowiednie lub niebezpieczne zachowanie pracowników często są oceniane przez innych jako negatywne, ale prawie połowa z nich pozostaje bierna ignorując niebezpieczną sytuację, większość pracowników respektuje tylko niektóre przepisy i zasady bezpieczeństwa, niektórzy badani nie spełniają ich wcale, przyczyną niebezpiecznego i ryzykownego postępowania jest ułatwienie pracy dla terminowej realizacji zadań. Najczęstszymi działaniami motywacyjnymi są środki perswazji jak rozmowa z pracownikami, sugestie, broszury informacyjne na temat wymagań kierownictwa i cele firmy. Aby częściej egzekwować odpowiednie zachowanie są używane kary zamiast nagród. Wyniki oceny poziomu motywacji do bezpiecznych zachowań pracowników nie są zadowalające. Badania wykazały, że motywacja pracowników analizowanej populacji jest na niskim poziomie.

Słowa kluczowe: motywacja, bezpieczeństwo.